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ABSTRACT

The bridging theme of the AMTEC'93 conference provided the stimulation to look beyond traditional boundaries: across international borders; across levels of disciplines and school systems; across social differences and across individual differences. These bridges can help make learning more effective, as can attention to related contemporary issues including learning to do more with less; reaching out to the nontraditional student and, the new technologies--teaching about them, using them, and analyzing their effects. This volume contains about half of the papers presented at the conference relating to the bridging theme. The papers are as follow: "The Guelph-Waterloo Video Link" (G. W. Ballantyne); "Gone But Not Forgotten" Videodisc Technology Bridges the Past to the Present" (Danielle Fortosky, Teresa Thacker, and Todd Zazelenchuk); "CMI Behind Bars: Comparative Analysis of PLATO Between Two User Groups" (Genevieve Gallant); "The Survival of a School District Media Production Department" (Gregory Gutenko); "AIMS CoPlanner: Computer Software to Facilitate Preservice Resource Teacher Education" (Leonard Haines); "A CAL Project: Money Skills for the Intellectually Disabled" (I. J. Hayward); "The Role of Instructional Design and Information Development in Guiding Technological Change" (Margot Hovey and Rob Pearson); "Learning in the Workplace: An Integrated Approach" (Miria Ioannou); "Graduate Distance Education: A Pilot Experience" (M. F. Kennedy, D. P. Janes, and B. A. Park); "Creativity on a Budget: Joint Community Health Education" (Richard J. Knecht); "Historical Realities and Continuing Mandates: Technology and the Paradigm for School Redesign" (James J. La Follette); "The Changing Role of the Media Centre in the 90's" (Helene Lavallee and Ross Mutton); "Motivating Students: Lessons From Theory" (Richard F. Lewis); "A Hypermedia Paradigm for Contrastive Phonetics" (Zopito Marini and Corrado Federici); "A Conceptual Framework for New Paradigm Research in Human Sciences: Phenomenology" (Linda M. McKay); "Using Amiga Computers for Media Production in Support of Teaching and Learning" (Robert McKenzie); "Music in Education" (Dave Morton); "Telecommunications Networking for Distance Education" (Richard J. Simpson); "A Self-Assessment System for a Developing School System" (Stephen G. Taylor); "Television in the 90's: An Industry in Transition or Trouble?" (P. G. Whittingham); and "Adapting a Commercial Newspaper Editorial System for Teaching and Learning" (Marian G. Williams). References are included with most of the papers. (TMK)

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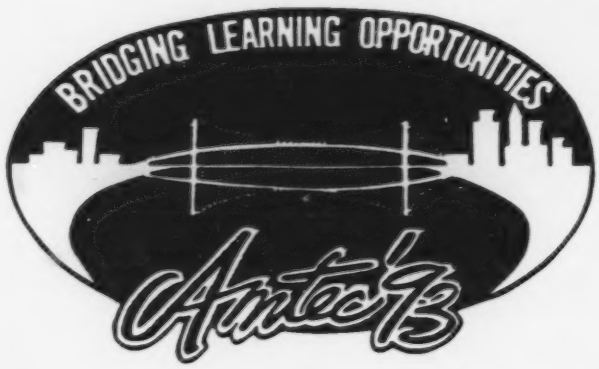
Bridging Learning Opportunities



Windsor, Ontario

June 14 – 16, 1993

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Bridging Learning Opportunities

Conference Proceedings

June 14 - 16, 1993
Windsor, Ontario

Editors

Stuart Selby
Esio Marzotto
University of Windsor

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PREFACE

The theme of AMTEC '93, Bridging Learning Opportunities, was intended to reflect the current educational milieu as perceived by the conference organizers. We are in a time of serious economic restraint and a time when the demand for cost-effective as well as learner effective education and training has never been greater.

The Ambassador Bridge, linking Canada and the United States, stands as a literally towering symbol over the Windsor waterfront. It links families, friends and professional colleagues as well as the economies of the world's two greatest trading partners. It is natural, therefore, that the organizing committee chose it as the conference symbol. The bridging theme provided the stimulation to look beyond traditional boundaries: across international borders; across levels of disciplines and school systems; across social differences and across individual differences. These bridges can help make learning more effective, as can attention to related contemporary issues including: learning to do more with less; reaching out to the non-traditional student and, the new technologies -- teaching about them, using them and analyzing their effects.

This volume contains about one-half of the papers presented in the simultaneous sessions of the conference. Unfortunately, deadlines for printing are necessary and only those received in time appear here. The texts of the plenary sessions are not included as the featured speakers were free to be spontaneous and include observations from the conference environment.

We are pleased to bring these papers to you, and we are sure that you will find them of interest and of value in bridging the gaps which separate us, and in creating more effective learning opportunities for our students and clients.

The Editors

THE GUELPH-WATERLOO VIDEO LINK

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Introduction

When the Universities of Guelph and Waterloo established their first joint graduate program in 1975 the reasons were both academic and economic. The "Guelph-Waterloo Centre for Graduate Work in Chemistry or $(GWC)^2$ would provide a graduate faculty twice as large with a greater diversity of interests for the students and would, at the same time, eliminate the duplication of courses. As the two campuses are only 25 km. apart, it seemed a simple matter to arrange transportation for the students to travel to the campus where a course was given.

The recognized success of $(GWC)^2$ led to the formation, in 1981, of a similar program in Physics: the "Guelph-Waterloo Program for Graduate Work in Physics" or $(GWP)^2$. Together, these two programs form one of the largest institutes of research and education in the physical sciences in Canada. The result of the success of the programs, however, was increased student enrolement and the resultant burden of student and faculty travel between campuses, with its attendant waste of time, and danger on one of Ontario's busiest highways.

In 1982 a working group was established to see if teleconferencing technology had advanced to the stage where it would satisfy the requirements of both the graduate students and the teaching faculty. "Television teaching" is viewed with some alarm by many academics, particularly in the sciences, who remember the disasterous efforts of "talking-head" classes in the 1960s and 70s. It was decided that the potential users should define the characteristics of the facility and determine what was acceptable without regard to any detailed knowledge of the state of the technology. Only after that process was completed was the communications industry to be consulted to see if they could carry out the design. A number of necessary and/or desirable criteria were identified:

1. The system must be "turnkey"; a university instructor should be able to walk into the classroom and activate the system at the push of a button without making sensitive adjustments or requiring the assistance of a technician.
2. The system must operate without the presence of a cameraman. The objection to cameramen is threefold: The most obvious is cost; as much as possible saleries must be avoided. Traditionally, third parties are not welcome in classrooms; the classroom is a sanctuary for teacher and student. Finally, cameramen would probably know nothing about the subject matter being taught and would not direct the camera to the material (teacher, graphics, blackboard etc) in

a way to be most effective for the students needs.
3. All students, local or remote must be able to see the professor and his teaching materials (graphics, blackboard etc.) with equal facility. The remote class must have the same freedom of choice as to where to direct their attention as the local class.
4. The teacher must be able to see both the local and remote classes with equal facility and be able to make eye contact with them.
5. Students in the remote class must have equal access to the teacher in the ability to attract his attention, ask questions and enter into discussions.
6. The teacher should not have to learn a large repertoire of new teaching skills. As much as possible the classroom should resemble the traditional environment, but the enhanced opportunities offered by sophisticated electronic media should be simple to learn and utilize.
7. The system should be completely symmetric between the two universities.

The result is the Guelph-Waterloo Video Link Project.

The Classroom

A special tiered classroom has been constructed on each campus containing 30 student seats at desks arranged in four rows. The students sit in pairs and share an Electrohome ECM 1310 VGA colour monitor. In front of the monitor is a low-profile microphone and a panel of four buttons. Two of these select either the current or the previous contents of an electronic white-board; the third selects a channel of video graphics from a video-presentation unit and the fourth is used to initiate a request to ask a question (the equivalent of raising your hand).

The front wall of the room carries two 5' X 3.75' rear-projection TV screens and an electronic white-board. One of the screens displays the output of the videographics unit (or video-tape) to both the local and remote class. The second projection screen displays the lecturer, standing either at the lectern or at the white-board, to the remote class and a view of the remote class to the local class. The TV projectors are Electrohome model ECP 3100.

The lecturer's podium consists of two units: One is a lectern containing the electroluminescent touch-screen control panel and a monitor showing the remote class. The adjacent unit carries the graphics unit and its monitor. Video and audio tape units can be housed in the cabinets in the podium's base.

Two cameras are used to display the lecturer to the remote class: One is a view of the lecturer at the podium and the other at the electronic white-board. Switching between the two views is controlled by passive infrared detectors. A camera with a wide angle lens mounted over the white-board provides the view of the students.

The electronic white-board is controlled by a 386 PC and the touch-screen control has been programed to allow the lecturer to exit the white-board mode and use the PC directly for programing, video-graphics etc. The computer keyboard is mounted beside the

white-board.

Provision has also been made for FAX communication between the two classrooms utilizing one of the audio subcarriers on one of the microwave channels.

Modes of Operation

The system may be operated in three different modes. The default mode upon activation is the Class Mode. In this mode the lecturer is displayed to the remote class on one projection screen and his graphics on the other. In addition the three student monitor channels carry the active and previous white-board contents and the graphics. The lecturer may select wireless (default) or podium microphone and all the student microphones are off. This is necessary as the accumulated writing and paper-shuffling noise on 38 open microphones is intolerable in a lecture setting.

If a student wishes to ask a question he activates the "?" button on his panel and his request is entered into a memory stack. A running display of the number of requests appears on the touch screen panel for the information of the lecturer. In addition the first request causes a "beep" so that he is alerted to the request. If the instructor wishes to respond he touches the panel on a flashing display which says "NEXT QUESTION" and the student,s microphone is activated. This is indicated by a flashing red light which informs the instructor which student he is talking to and informs the student that he can speak. Repeated pressing of "NEXT QUESTION" activates the microphones and flashing lights of the students in the order in which they entered the queue. A student may drop out of the queue by pressing "?" again.

The second mode of operation is the Discussion Mode. In this mode all visual presentations are as in the Class Mode, but all microphones are activated automatically so that general discussions can be held. The question request system does not operate.

The third mode is the Conference Mode. In this case the cameras viewing the podium are deactivated but each class room is displayed to the other. All classroom microphones are activated automatically and in this way meetings can be conducted. The white-board still operates but channel 3 on the monitors also carries the view of the other classroom. The question request system does not operate.

Touchscreen Control Panel

The control of the system has been designed to never tax the lecturer with too much information or the necessity of making too many choices. To activate the system he enters in a four digit password. Upon acceptance the system initializes itself and then asks for the number of 15 minute intervals required for the session. This ensures that the system will automatically be placed in standby after a further 15 minute grace period. The main menu then appears in the Class mode with touch selection available for Discussion, or Conference or Reset. In addition other menus may be selected from the main menu. These are Computer, Videotape, Audiocassette, Question. The Computer menu offers the ability to

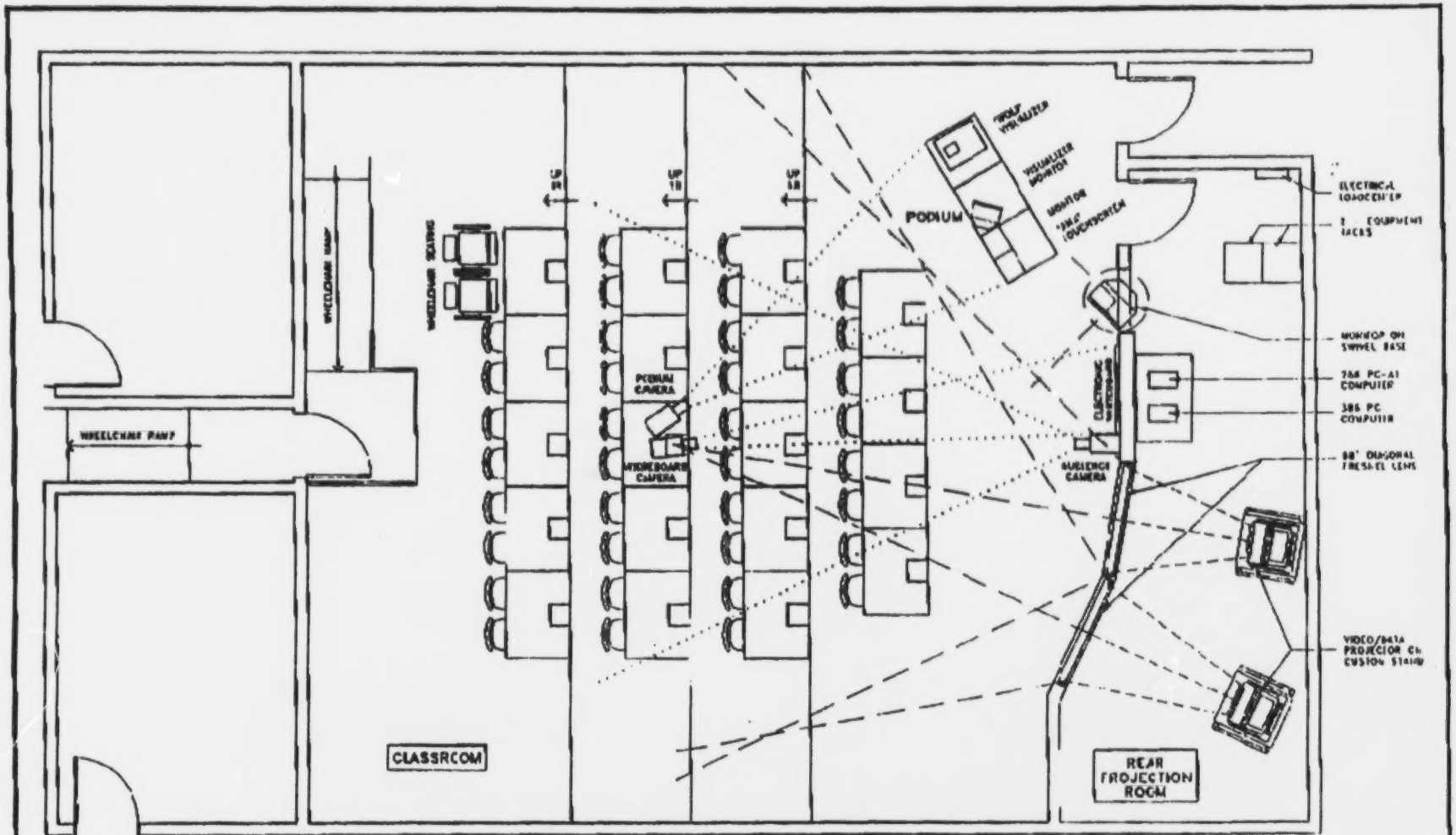
toggle between the white-board and DOS as well as the soft function keys PF1 to PF10. Videotape offers selection between VHS and 3/4" and then, in common with Audiocassette the usual array of "play, stop, rewind", etc. The Question menu has been described above. All permit return to the main menu. Every menu includes a volume control for the audio level.

The Microwave System

As the two campuses are only 25 km apart, and have good line-of sight communication between the taller buildings, the least expensive long term investment was in a private microwave link with two television channels each way along with their attendant audio and data subcarriers. The microwave transmitters operate at a power of 100 mW, in the 15 GHz band. Using 6' dish antennas the estimated fade margin is 37 db for a predicted reliability of 99,95% (including meteorological effects).

Canadian Content

A concerted effort was made to maximize the Canadian content of the project and, in fact, fully two thirds of the dollar value of the contract was Canadian. The prime contractor for the project was Applied Electronics Ltd. of Toronto, who were responsible for the detailed design, purchase, installation testing and proving of the system. The four video projectors and the 40 colour monitors were supplied by the Electrohome Corporation of Kitchener ,Ontario. The Electronic white-board was developed by KTS Electronics of Kanata, Ontario. The firm of Elder Engineering Inc. of King City Ontario were the consultants on the microwave path analysis.



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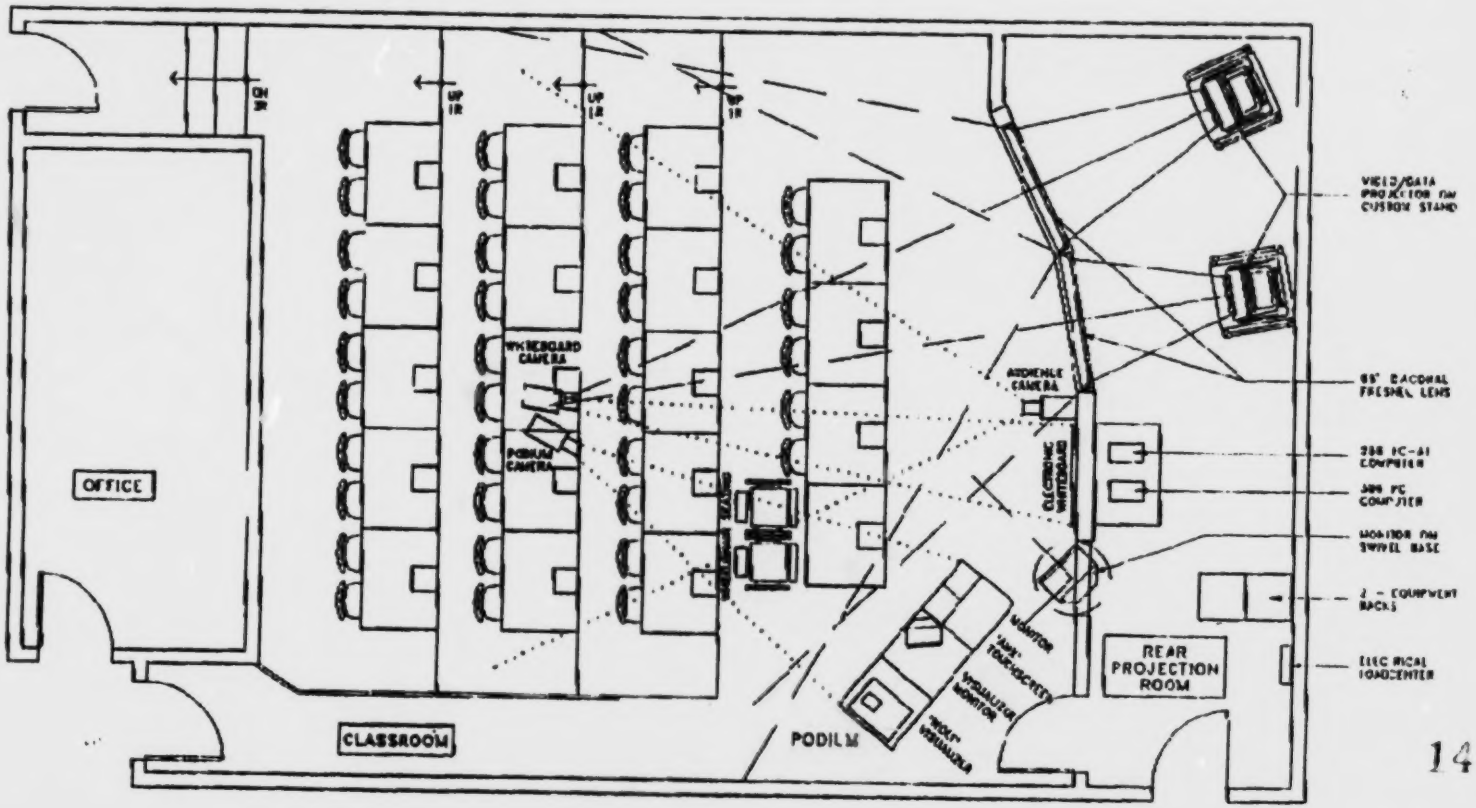

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GONE BUT NOT FORGOTTEN: VIDEODISC TECHNOLOGY BRIDGES THE PAST TO THE PRESENT

by
Danielle Fortosky, Teresa Thacker, Todd Zazelenchuk

Gone But Not Forgotten is a project which began as a way for local public school students to learn more about Canada's involvement in war and to better understand the significance of Remembrance Day. The resulting multi-media presentation is an example of how Canadian veterans, a rural school system, and the University of Saskatchewan cooperated to bridge learning opportunities for grade six students at Westberry School in Kindersley, Saskatchewan, as well as students involved in the educational communications program in the College of Education at the University of Saskatchewan.

Todd Zazelenchuk, a graduate student in the College of Education who is also teaching grade six at Westberry School, initiated the idea to join together the modern frontiers of computer and television technology with the historical research of Canada's involvement in the first and second world wars. As a teacher, he determined that the interest in this subject was best comprehended by his students through their direct involvement in the project itself. The students themselves asked questions about Remembrance Day which they subsequently researched to prepare the multi-media program comprised of a Macintosh computer, laserdisc player with an interface for the Mac, and a video monitor. Their teacher was then able to incorporate his knowledge and interest in computer programming to develop a HyperCard program which demonstrated a modern and interesting approach to present their findings on the topic. The active involvement of the students as well as the Canadian veterans provided an opportunity to bridge the knowledge and experiences of the veterans with the students' energy, enthusiasm, and desire to learn. This, along with the combined medium of television and computers provides a unique interactive and participatory learning experience.

The University of Saskatchewan's Division of Audio Visual Services (DAVS) offered production expertise and television facilities to make the project possible. This initiative supports the University's recognition that the teaching/learning process involves much more than the passive reception of information. The University also supported this project from a research perspective in that the DAVS producer is himself a PhD candidate in history and worked with both students and the teacher to share his historical research skills. Evaluations of the project in progress indicated a widespread interest in the topic of the wars as well as an urgent desire to provide the information to a generation learning about it second-hand. *Gone But Not Forgotten* has received much attention over the past 18 months - locally, provincially, and nationally. There have been numerous newspaper articles, magazine articles, and conference presentations spotlighting the project. As well, CTV featured some of the students and veterans who participated in the project on *The Provincial Report* in November, 1992. In August, 1992, Todd travelled to Vancouver, B.C., to accept a national award

sponsored by Northern Telecom. The award, intended to recognize Canadian educators who implement creative technology in the classroom, was one of eight presented during the week-long annual conference that emphasizes technology in education. The project was also selected by the Saskatchewan Teachers' Federation as its first entry to be considered for the 1993 Hilroy Fellowship. In February, 1993, Todd was informed that he was one of 28 Canadian project winners for this national award.

In today's world of rapidly advancing communications technology coupled with limited and declining resources, this innovative teaching project demonstrates how to make use of developments in learning and effectively overcome some of the obstacles faced by educators today.

CMI BEHIND BARS:
COMPARATIVE ANALYSIS OF PLATO BETWEEN TWO USER GROUPS

by
Genevieve Gallant
Instructor Cabot College

Introduction

Her Majesty's Penitentiary (HMP) is one of 5 provincial correctional centers in Newfoundland which use computer-based instruction in conjunction with traditional teaching strategies to deliver education to inmates. The PLATO Integrated Learning system, a product of The ROACH Organization (TRO), was introduced in 1990. PLATO, a local area network combining computer hardware and software, has extended the school, a separate building, into 5 living units in the prison. Program delivery in the classroom and on the living units is different. The classroom has the assistance of instructor direction, print and non-print resources, and computer assisted learning. On the living units computer assisted learning is the primary form of instruction.

This paper provides an overview of the approach to the delivery of educational programs at HMP, the curriculum offered in the 1991-92 school year to both groups, a comparison of their achievement results, some problems associated with the delivery, and the future direction for inmate education at HMP.

Educational Programs and Delivery

The Adult Corrections Division of the Justice Department in 1990 recognized that traditional teaching strategies were not sufficiently effective for the inmate population. The PLATO Integrated Learning system was introduced as a resource tool for the curriculum and to provide familiarity with the use of computers in the workplace.

Six computer terminals were located in the school and ten computers were placed on five (16-person) living units in the prison. Two living units house thirty-two inmates in protective custody. These inmates do not mix with the general population, for their own safety, and, therefore, are denied access to the school. PLATO, for those on the Protective Custody unit, is the primary method of education. With the introduction of PLATO, distance education was introduced to the prison!

PLATO consists of a network server, administrator's work station and student workstations. This system operates through Novell Advanced Netware v2.15. The workstations are 286 computers with dual floppy drives, the administrator's workstation is a 286 with a 3 1/2" floppy drive and an internal 150 megabyte SCSI tape drive. All are standard PC-based terminals networked to a fileserver which is a 386 with 4 megabyte of RAM and a 355 megabyte hard drive. One dot matrix printer, located in the

school, serves its 6 terminal locations. A second dot matrix printer on the PC unit serves those four terminal locations.

Instructional support and curriculum is provided by a community college. The curriculum delivered is Adult Basic Education (ABE). It is an accredited provincial education program and recognized by Newfoundland's post-secondary institutions. The ABE program replaced the Basic Training and Skills Development (BTSD) program as a standard defining high school equivalency in 1990. ABE consists of Level I (Literacy), Level II (Grade 9) and Level III (Grade 12).

Level I is recommended for those whose scores fall below 7.5 on the standardized Test of Adult Basic Education (TABE) which is the minimal community college standard. Level II proficiency requires a 65% pass in 19 courses - communication skills (five courses), math (nine courses), and science (five courses). Level III requires 36 credits, with a minimum of 6 credits in each major area - communications, math and science and a maximum of 12 in general options such as history, computer studies, personal development, and career awareness.

ABE Level II and III course objectives were aligned as closely as possible with the PLATO courseware by the instructors in the prison school and program developers from the community college in 1992.

PLATO courseware is used in the school as a resource accompanying ABE textbooks and instructor direction. Students are rostered onto the computer system, given the PLATO modules aligned for a particular ABE course, and their progress monitored by the instructors through each learning module. Upon completion of each course, a written test, developed by the instructors, is given.

PC unit and other living unit students assigned PLATO activities follow the same procedure as the school students. Instructor interaction consists of infrequent one to two hour visits, usually bi-monthly. If students have problems at times outside these visits, telephone conversations are used to assist them. When the student feels he is ready, the same written test as that given to school students is administered. A trusted inmate on that unit is used to invigilate.

Non-academic computer courses are also networked on the system. The courses offered from September 1991 to June 1992 were: WordPerfect, MS DOS, D-Base, Lotus 123 , and Bedford Accounting.

Learner Profile

The age of HMP learners in the school and the PC unit ranges from 18 years to 40 years with an average age of 22 years. Their educational level ranges from literacy to grade seven. TABE scores of both PC unit students and classroom students range from 2.9 to 7.9 with outliers at 2.0 and 10.9.

Inmates usually have a combination of education problems. Many students come from socially deprived environments, have a history of drug abuse, carry unpleasant memories from their early days in school, have some learning disability, and psychological problems. Most are repeat and/or juvenile offenders imprisoned for break and entry, drug trafficking, fraud, theft, physical and sexual assault. These students lack social and/or coping skills.

The length of incarceration time ranges from six to 17 months with the average time served being eight months. HMP is a medium security prison housing inmates given a maximum sentence of two years less a day. There are some federal inmates awaiting transfer to another institution or who come home to serve the last part of a longer sentence. These inmates, some of whom were enroled in educational services provided by federal prisons, often seek entry to the HMP school.

Student Placement

Thompson (1989) characterizes distance education students as more likely to be "independent, autonomous learners who value the opportunity to control the pace at which they learn ... many seek only limited interaction with their instructors." The ABE program at HMP is delivered as an individualized, self-paced instruction where the learner is in control of the learning process with support from the instructors, resources, and other students. The use of computers permits the student to maintain autonomy as he follows a particular course of study.

An interview is initiated between the instructor and a potential student to determine appropriate courses. This interview allows the instructor to hear what the student feels he needs in terms of upgrading, self-reporting of his academic level, and how motivated he is to improve himself. After this interview TABE is given and his provincial school transcript is acquired (if there is one) to determine which ABE level is required.

Student Enrolment

HMP school enrolment is on a continuous intake/exit basis. In September 1991 the school enrolment was limited to 15 students as the two teaching units were reduced to one and a half. The provincially recommended student/teacher ratio for adult learners is one teacher to 10 students. The ratio for literacy students is one teacher per six students. On the PC unit such no restriction exists. Anyone who wishes to enrol in education is placed in an appropriate course.

Students who enrol in the education programs, both in the school and on the PC unit, usually continue with courses until their release or parole. There were, in the 1991-92 school year, 71 students in the school and 25 from the PC unit.

Results

A study, conducted of offenders by the Research and Statistics Branch of the Correctional Service of Canada concerning the impact of ABE on their community reintegration and adjustment, showed ABE has a positive impact on community adjustment. The study further states achievement of ABE is often the offenders' first success in any educational system and is motivation for them to continue their studies in academic or vocational programs. These statistics are evidenced at HMP.

A second study conducted by Research and Statistics Branch indicated participation in ABE showed a decrease in recidivism. Results of this study can also be seen at HMP as only one graduate of ABE has returned to prison in a two year period.

Student enrolment in the school for the year 1991-92 was 71. The majority of students worked in Levels I and II with 35% of the school population in Level I and 32% in Level II. Students in Level III made up 15% of the school population. Twelve students in non-academic computer courses made up 17% of the school population. (see Table 1).

ABE Level I	25
ABE Level II	23
ABE Level III	11
Word Perfect	7
MS DOS	1
Lotus 123	2
D-Base	2
Total	**71**

Table 1: Student enrolment by program in School 1991-1992

The literacy program, Level I, is concerned solely with increasing the reading and writing level of students. The length of time in Level I depends on the student's level of illiteracy. Many students do not receive certificates of completion as their release or parole dates arrive before they have increased their reading level to meet the college standard to enter Level II

(TABE 7.5). None of the 25 students in school nor six on the PC unit in 1991-1992 received a certificate of completion although many had increased their level of literacy.

Of the 23 Level II students, 18% completed the required course work. Of the 11 Level III students, 55% completed the 36 credits required for completion to receive a high school equivalency. Of the 12 students in non-academic computer courses, 100% achieved certificates in each course. (see Table 2).

ABE Level I	0
ABE Level II	4
ABE Level III	6
Word Perfect	7
MS DOS	1
Lotus 123	2
D-Base	2
Total	**22**

Table 2: Student diplomas earned in School 1991-1992

Student enrolment on the PC unit for 1991-92 was 25. The majority worked in Levels I and II with 32% in Level I and 16% in Level II. Students in Level III made up 8% of the population. Eleven students in the computer courses comprised 44% of the total population. (see Table 3).

ABE Level I	8
ABE Level II	4
ABE Level III	2
Word Perfect	6
MS DOS	2
Lotus 123	2
D-Base	0
Bedford Accounting	1
Total	**25**

Table 3: Student enrolment by program on Protective Custody Unit 1991-1992

Of the four Level II students, 25% received a certificate. Neither of the two students in Level III completed the 36 credits for a Level III diploma, although both completed most of the course work. Of the 11 students in non-academic computer courses, 99% received certificates in each courses. (see Table 4).

ABE Level I	0
ABE Level II	1
ABE Level III	0
Word Perfect	5
MS DOS	2
Lotus 123	2
D-Base	0
Bedford Accounting	1
Total	**11**

Table 4: Student diplomas earned on Protective Custody Unit 1991-1992

Summary of Student Achievement

A comparison of the number of diplomas earned by both groups shows a large difference in favour of Level III students in the school (55% completion rate versus 0% on the PC unit). This difference results from the fact not all Level III courses are available to the PC unit on PLATO. These students rely solely on the computer based instruction with prescribed text book and limited instructor guidance as resources. The test score on individual courses are comparable for both groups however, school scores are generally 5% - 10% higher.

Level II diplomas earned show a smaller margin in favour of PC unit students with 25% earning diplomas versus 17% in the school. Level II content has been completely aligned on PLATO. The difference between both groups' test scores is negligible.

The non-academic computer courses show a high success rate by both groups with a difference of only 1%. This is attributed to the fact that most computer students have at least achieved a high school education before beginning these courses. They also have practical applications for the software available, primarily in writing parole papers, appeals, and letters to prison officials, their families and friends. Others, in business, are highly motivated as they want to learn computer programs that will assist them upon release.

Problems

As with any institution the educational program at HMP comes with its share of implementation problems.

1. ABE Level III Science Program.

The Level III science program cannot be implemented on the computer system as the PLATO courseware is not completely aligned with the ABE objectives and there are no laboratory simulation programs available for inmates who do not have access to a science laboratory outside the prison.

2. Literacy Program.

PLATO courseware used at HMP is not suitable for students whose TABE score is less than 4.0. Any student who falls below this score must work directly with the instructor using print materials.

3. Computer Down Time.

Computer network down time, caused in some cases by inexperienced instructors attempting to learn or modify the PLATO system and by necessary repairs to computer terminals poses problems for school students who wish to work in the evenings and a major problem for those on the PC unit.

4. Instructor Familiarization with Computer Based Instruction.

In the present year, 1992-93, the HMP educational program had nine different instructors due to unionized bumping caused by the lay off of permanent employees at the community college. Four of these positions (two people at two different times) were the regular instructors in the 1991-92 school year and they had experience with delivering education through the PLATO system. The other five instructors, appointed for varying periods while awaiting re-instatement in community college positions, had limited knowledge of computers in general and no knowledge of PLATO operations. As no community college instructors have had in-service training on PLATO, changing out instructors during the school year causes problems for students who use PLATO as the only method to increase their level of education. As well, few community college instructors have experience working in a prison system. Only one of the five teachers made any attempt to go to the PC unit to determine student needs.

5. Instructor Availability.

With all the variables stated above and only one and a half teaching units, time for an instructor to get to the PC unit to meet with inmates interested in working towards a high school

equivalency is at a premium. Interviewing, determining an appropriate course of study, monitoring achievement on the system, testing, and time to arrange the necessary resources to accompany any course not completely aligned with ABE is a full-time job in itself. The instructors must also perform these tasks in the school.

Future Directions

The John Howard Society, Newfoundland Branch, hopes to implement a three year pilot project in the next six months. The project, with the aid of the existing PLATO system, is designed to increase the level of literacy, formal education, and job skills for inmates and ex-offenders. They plan to increase the number of computers at HMP to a ratio of one computer for every two inmates incarcerated for a period greater than six months (20 computers). They propose to increase the instructional staff from one and a half to two and a half teaching units, hire a computer assisted learning coordinator, provide volunteers with literacy and computer training to allow weekly visits to each living unit and develop supportive sites in the community where ex-offenders can avail of continuing computer-based educational programs.

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THE SURVIVAL OF A SCHOOL DISTRICT MEDIA PRODUCTION DEPARTMENT

by
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Institutionally owned and operated media departments suffer a precarious existence. Few enjoy a complacently stable existence within their host organizations. Most are constantly involved with exercises in self-justification and the documentation of their significant support of the institution at large. Several factors can be suggested which can contribute to this insecurity:

1. Internally owned and operated media production services are relatively recent additions to most organizations when considered against personnel, payroll, maintenance, and other operational functions that are deemed essential, fundamental, and around in some form since the dawn of organized human enterprise. In comparison, media departments are perceived as recent add-ons (Luxury items? Image accessories?) that can and should be dispensed with if the health and best interests of the institution require "right-sizing". That which is recognized as basic and indespensible will remain. The fat will be trimmed.

2. Media production departments often seem to bestow their attention and services in support of only certain selected organizational activities; they are not widely integrated into the full spectrum of the corporate routine. This also contributes to a generally held impression that media production is a peripheral and non-essential activity.

3. Media production personnel are often perceived to be "outsiders". They are not in the same business as the rest of the organization. They are media creatures, with their own "alien" professional and academic backgrounds, processes, and language. Again, this fosters isolation from the corporate body.

Certainly, there are other destabilizing factors that can be mentioned, such as the difficulty of justifying expenditures that do not clearly and directly show revenue generation or recovery. (Documentation and arguments that track and explain actual income or savings realized by media implementations are not always satisfyingly obvious and easy to follow...not a "quick read".) However, the factors listed above relate directly to a number of basic precepts derived from organizational psychology studies. This paper will detail and explain these precepts, and apply them to the history of the Kansas City, Missouri School District's Television Production Department.

In light of this paper's title, the survival of a school district media production department, the use of this particular media department as an example may be somewhat unsatisfying since this department did <u>not</u> survive, and was in fact abolished along with its "parent" publicity department in 1991. However, as a postmortem examination, it does serves to illustrate the correlations between the following organizational psychology prescriptions and the critical isolated and integrated stages of its seventeen year existence.

Interlocked Behaviors

Organizational psychology does not deal with the behaviors of individuals; there is no examination of the subconscious or personal neuroses. It deals instead with the behaviors of human organizations. Instead of neuroses, there are *structural dynamics* and *bounded rationalities* under examination.

An organization can be defined as an entity composed of subentities (divisions) which are in turn composed of subentities (departments) which are then in turn composed of subentities (individuals), the hierarchies of which might be metaphorically represented by an organism/organ/cell/molecule/atom physical construction. This perspective, however, misses the crucial aspect of interacting dynamics--the patterns of functional relations among entities--that empowers these organizational components and positions them within the context of the whole.

The view that "organizations are grounded in *interlocked behaviors* rather than interlocked people" is fundamental in organizational psychology.[1] If interlocked behaviors are indeed the foundation of organizational structure, then the restricted interactions of most media departments are misanthropic to say the least. A lack of consistently reinforced and widely distributed interlocked behaviors will isolate these departments, leaving them ill-defined, outside the stability of the organization's routine behavioral system pattern, and vulnerable to disruption and termination. Just how many other adjacent departments would have their ongoing and critical interlocked behavior patterns disturbed by a transferred or eliminated media production department? The dismal reality is that many media departments have been, are now, and soon will be displaced or eliminated with hardly a ripple felt in the rest of the organization.

In many respects, media departments are associated with their parent organization as though they were a hired gunslinger retained by a community of ranchers or farmers in the mythological Old West. A gulf separates the day-to-day routines of the two. The hired gun has a greater affinity, and so a correspondingly higher potential for interlocked behaviors, with other hired guns, not the host community. In the typical mythic scenario, the rancher/farmers utilize the expertise of the hired gun during a crisis, and once normality is established, the gunslinger is shunned and cut adrift. This is not too dissimilar from the ostracization faced by soldiers once peace has returned to the homeland. Viable media professionals are well aware of this tendency for estrangement, and conscientiously work towards their maximum integration with the goals, shared views, and institutional philosophies of the greater corporate body.

Dependency or Autonomy?

Yet in spite of such efforts, video departments are not usually viewed and accepted by the organizational whole as natural evolutions of a historically defined and behaviorally integrated system. They may appear to be sprouted like mushrooms from out of nowhere, or they may have been nurtured by a more conventionally defined department, such as training or marketing, as an adjunct service activity or an evolution of existing services. The wide diversity of "umbrella" departments within which many media operations are contained suggests a sort of "identity crisis" faced by the incorporated operation.[2] It must interact with the larger organization from within the interlocked behaviors of the sponsoring department. Even if an incorporated media department tries to work directly with a wide range of institutional clientele, they will still be identified by most with the narrower goals and functions of the sponsor.

This is a bit like being a teenager living at home. Having necessities such as shelter and food provided by one's parents can be convenient and comfortable, but this dependency has its risks. The ills and misfortunes that might befall the parents will also have their way with the dependent child. An incorporated media department may enjoy relief from budget battles and internal politicking when these matters are handled by the management of the host department, but should the host's performance, role, or ideological positions fall into disfavor, the media operation will very likely share in any dire consequences.

Autonomy is certainly more work, both for teenagers out on their own and for media departments who must lobby for their own budgetary needs and justify and document their contributions to the organization. But independence from a founding department also realizes a freedom to disengage from the limits of the founder's purview and engage with all other constituents of the organization on a more equitable basis.

Even if a video department actualizes an autonomous identity within the organization, it may still be isolated by the lack of established *habit-meshing*, the routinized and frequent fixed interlocked behaviors that makes one entity part of the environment of others.[3] A gunslinger who is habit-meshed with his farm clientele would be participating continuously in the fundamental aspects of the crop planting/growing/harvesting process. It's not enough to be sociable. To overcome the randomness of most media communications activities requires the establishment of frequent and routine interlocked behaviors with other organizational operations. This may necessitate the development of serial programming and services with a weekly or daily schedule, and the choosing of ongoing "permanent" projects, rather than isolated, one-time-only products.
This is often an unappealing choice for creative people to make, since it is usually the "special" projects that are endowed with the larger budgets, will be the most well-executed, and will earn the applause and recognition of fellow media professionals. Routine services, in comparison, are usually "no frills" offerings

that can feel tedious and positively unenthralling to work on. It's not "showbiz". The important thing, for the sake of survival, is that it's habit-meshing.

The essential factor in this approach, however, is the establishment and maintenance of *interlocked behavioral cycles* with client departments. In terms of defining a secure position for any department within an organization, it is the extent and multiplicity of operational interactions rather than product output that is paramount.[4] It does no good to generate lots of serialized programming if it is produced in isolation from the client department. In this case, the media service would have a visual, but not interactive, presence in its surrounding environment.

A Strategy for Security

To build these interlocked behavioral cycles means acting, not independently in isolation, but dependently through functional patterns with client systems and staff. It may be necessary for the media manager to discard some autonomous efficiency and contrive aspects of project development and/or management to transfer into and share with the client department. Opportunities for project research, expertise input, evaluation, distribution, phase approvals, and brainstorming can be devised as interactive process activities.

Initially, it may cost the department in terms of time, persuasive effort (the client is being asked to adopt transactional work loads!), and scheduling. Client departments may resist rather than welcome increased involvement in their own projects' development. Production personnel will have to become more adept and efficient at interpersonal communications; it won't be enough to be an artist only with images.

The construction of interlocked cycles will be resisted by a very powerful inertia, this being the existing structure of the total system of interlocked behaviors that are in place at any given time. Any addition of behaviors to the system is necessarily a disruption of the system. Once the desired interlocked behaviors are established, however, it will be this very intrastructural inertia that will provide a new form of security for the now "interdependent" department.

Interlocked Behaviors, Autonomy, and a School District Media Department

In applying the preceding organizational precepts to our "real-world" example, it must of course be acknowledged that the real world is messy, filled with confounding variables, and many other elements of success and failure aside from interlocked behaviors and autonomy had their part in the life and death of the Kansas City, Missouri School District's Television Production Department. This analysis is also dependent on participants' and observers' subjective interpretations as to when this department was most secure and most at risk.

The department evolved through three distinct configurations, with each demonstrating a relationship between the organizational principles discussed and the security and prosperity of the department.

Dependent and Isolated
1974-1984

The Television Production Department was established in 1974 by the Division of Career and Continuing Education and mandated to create instructional video materials in support of vocational training at the secondary and adult level. It was directly administered by this division, was funded entirely by federal grants dedicated to career education, and its production facilities were located at the Kansas City Technical Education Center. Staffed by two producer/directors, who also performed all technical work, the department's activities were restricted to vocational instruction applications. On rare occasions, the staff were granted dispensation to work on non-vocational programs, but these projects (such as broadcast Public Service Announcements) required a transfer of funds from the "outside" school district client department to the grant funded account, a process which required approval and action at the assistant superintendent level. This was a daunting process which effectively discouraged the use of the video department for applications other than those within the career education division.

In this configuration, which remained essentially unchanged for ten years, the television production department was dependent on and interlocked with only its parent division. With assured continuity and support, the staff were free to develop high-quality (often award-winning) video and multi-image instructional, career counseling, and student recruitment programming. While the media production personnel recognized that there were many contributions that could and should have been made to the district at large (and many requests were ventured), the security blanket of dedicated federal program funding made any kind of proactive service development for justification and survival unnecessary. This was a time of comfortable childhood for the television/media department.

Dependent and Interlocked
1984-1988

It often requires cutting the purse-strings to get the child out of the house, and so it was with the television production department. By 1982, the gradual and predictable cutback in federal funding alerted the department to the inevitable; by 1985 there would be cuts reaching into the department itself. The department then proposed that it be surrendered by the Division of Career and Continuing Education (and dependency on the diminishing but predicable federal "formula" funding) and adopted by the Office of Public Information (OPI) (and a dependency, through it, on annually reviewed district operating funds). This was a move towards greater interaction and interlocked behaviors with the district at large through the widening services of the OPI, which was soon to become the District Communications Office (DCO). This adoption fit in with the new DCO's

expansion into internal communications, public relations, publicity, instructional support of schools, and government relations.

Concurrent with this new parent department's general expansion was the implementation of the Kansas City, Missouri School District's Magnet School based desegregation plan. Video, photography, and print production were built up principally to handle the publicity and parent/student recruitment for the new Magnet School system. However, there was also a commitment by the DCO at this time to support a wide variety of district communications needs. There was an upgrade of the production facilities, a move to a more visible location in the central administration building, and the addition of a producer/writer in 1985 and a videographer in 1988. (However, the videographer was added in support of Magnet School promotional production only, and this presaged a fatal change of focus in departmental priorities.)

Between 1984 and 1988, the media production "sub-department" developed its most comprehensive range of service and support. In the area of publicity and public information, it recorded bimonthly school board meetings for cablecast and produced a weekly news program, also cablecast, called *District Directions*. This latter program followed a television newscast format and featured a video tour of a different school each week, profiles of district administrators, teachers, and outstanding students, coverage of current issues in an talk show segment, and the presentation of shorter items using an on-set anchor.

In the area of staff support, the department conducted video production workshops for teachers and counselors (who would shoot material with school-owned camcorders) and provided both editing access and assistance for these independently produced projects. Staff training and information videos were created for the personnel department, including recruitment programs and orientations for new employees. An "electronic bulletin board" (*District Datascreen*) displayed announcements (meeting and athletic schedules, birthdays, lunch menus, etc.) in the administration building's lobby and cafeteria. Inservice workshops, meetings, and receptions were recorded, edited, and distributed. Broadcast PSAs continued in production, along with instructional and promotional videos, for vocational, Magnet, and traditional curriculum support.

It is the recollection of the people who were involved with the video production operation[8] and the larger DCO[9] that this was their finest hour. Certainly, this period of time saw the greatest level of interaction with other district programs and offices. It saw the greatest diversity of programming forms, ranging from complex promotional videos, where outside production facilities were retained for postproduction finishing, to the simple, day-to-day updating of announcements on the *Datascreen* service. There was a conscientious effort made on the part of the staff to be as widely involved, to nurture as many interlocked behaviors, as was within their capacity to serve. Members of the staff also volunteered (and later would be invited) to observe on committees (such as Transportation and School-based Computing) and in workshops dealing with

issues and processes that often did not have a direct bearing on DCO activities.

While these engagements were elective and carried no obligations, they did provide occasions to become acquainted with and known to the wider district community. Indirectly, this sought-after awareness did indeed "pay off" quickly in facilitating both interpersonal communications and the design of media productions. The subsequent design and execution of media products evidenced an "authenticity" of organizational culture, language, symbolism, and institutional memory (message attributes so often missing or misconstrued in communications products developed by outside consultants). From the organizational psychology standpoint, this also established the *habit-meshing*, the routines of interlocked behaviors, that brought the DCO and its media department into the supportive inertia of the total system's behavioral cycles. What went wrong?

Autonomous and Interlocked?
1988

Beginning in 1986, the media department, being intuitively and professionally aware of the need for an independence that would assure a diversified district clientele, developed a management proposal[10] that would ultimately recommended putting media production services "out in the cold", with no one to blame for its failures but itself...autonomy.

This was not, however, a good time to suggest changes in district structure. District-wide attention and planning concerns were being directed towards the implementation of a nationally scrutinized Magnet School Plan, and propositions that were not directly relevant to this plan's facilitation, or obstruction, were of very low priority. The strategic focus of the district was becoming singular, and this narrowing view was to percolate through every strata of the organization.

Dependent and Isolated
1988-1991

It must be noted here, once again, that other factors can come into play that will affect the viability of a media department. In this case, the directorship of the DCO changed hands. Where the director of the DCO from 1984 until 1988 had been interested in a diversified support service in video and print, the new director was concerned with a clear and undiffused dedication to the promotion of the Magnet School Plan. Other production priorities were cut back or abandoned to "clear the slate" for Magnet marketing activity.

However, Magnet promotional activities, subject as they were to considerable review and debate throughout the district hierarchy and the community, were often delayed and and rethought, which left the previously well occupied and challenged media staff frequently idle and unchallenged. Morale suffered. Within two years (by 1990), half of the production staff had been lured away by other institutions.

By 1990, only the coverage of school board meetings and the *District Datascreen* were in regular production. The acquisition of footage to be used in promoting the Magnet Schools was the balance of video production activity and

this, due to the exhaustive, multi-committee review and recasting of marketing themes and concepts, yeilded very little finished product. More significantly, the media department, along with the DCO, had withdrawn itself from the rest of the district. It was no longer in contact with the teachers, students, parents, or administrators it once interacted with. It was no longer visible. Survival of the department was now dependent entirely on the survival of the DCO and in turn its performance in developing and executing a successful Magnet School marketing effort. Success in this effort was essentially to be measured entirely by enrollment statistics. Everyone's eggs were in one basket.

By 1991, with Magnet School enrollment figures falling short of the desired numbers and ratios, the District decided that the resources dedicated to Magnet School marketing would be better entrusted to outside agency design and production. At this point, the DCO and its video production facility were fulfilling no other significant purpose or service, and both were taken off life support. They had not been well for some time.

As of 1993, the *District Datascreen* is the only communications service in operation within the Kansas City, Missouri School District. It is maintained and programmed by the computing department. There are no video or other media production services available. Enrollment in the Magnet School system still falls far short of expectations.

Conclusion

Media professionals derive their assessments of work situations and their perceptions of relative success or failure from many sources and levels. They compile their assessments from direct experiences of interpersonal cooperation and conflict, from insights shared with other professionals at other institutions, and on the bases of professional standards, product quality, testable achievement of instructional objectives, and aesthetic sensibilities. These are vivid, ever-present, and immediate indicators of what's right and what's wrong. A media department's behavioral relationship with the institutional body, by comparison, is abstract and invisible.

To fully perceive, evaluate, and take a hand in all the factors which can determine survival requires looking beyond the immediacy of the hardware, software, and people contained within the walls of a media department. A heart does not survive for long outside the support of the body, regardless of how excellent a heart it may be. What's needed is virtually an ecological view of survival.

Notes

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8. M. Elaine Justus, Director of Communications, Benedictine College, personal interview, May 4, 1993, Atchison, Kansas.

9. Vicki Cummiskey, Emporia State University, personal interview, May 6, 1993, Emporia, Kansas.

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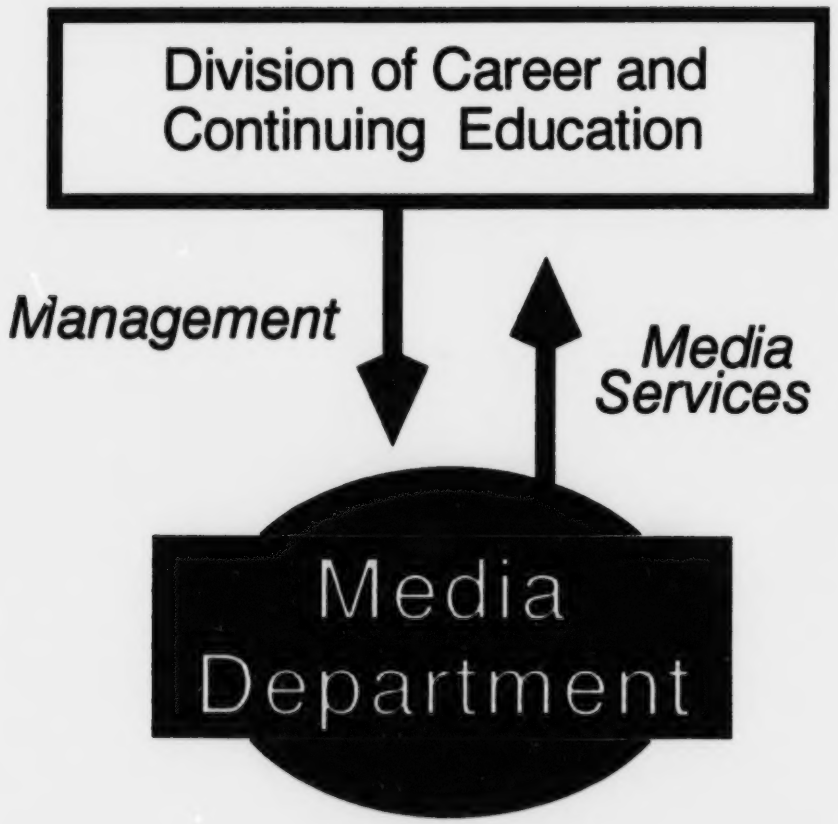
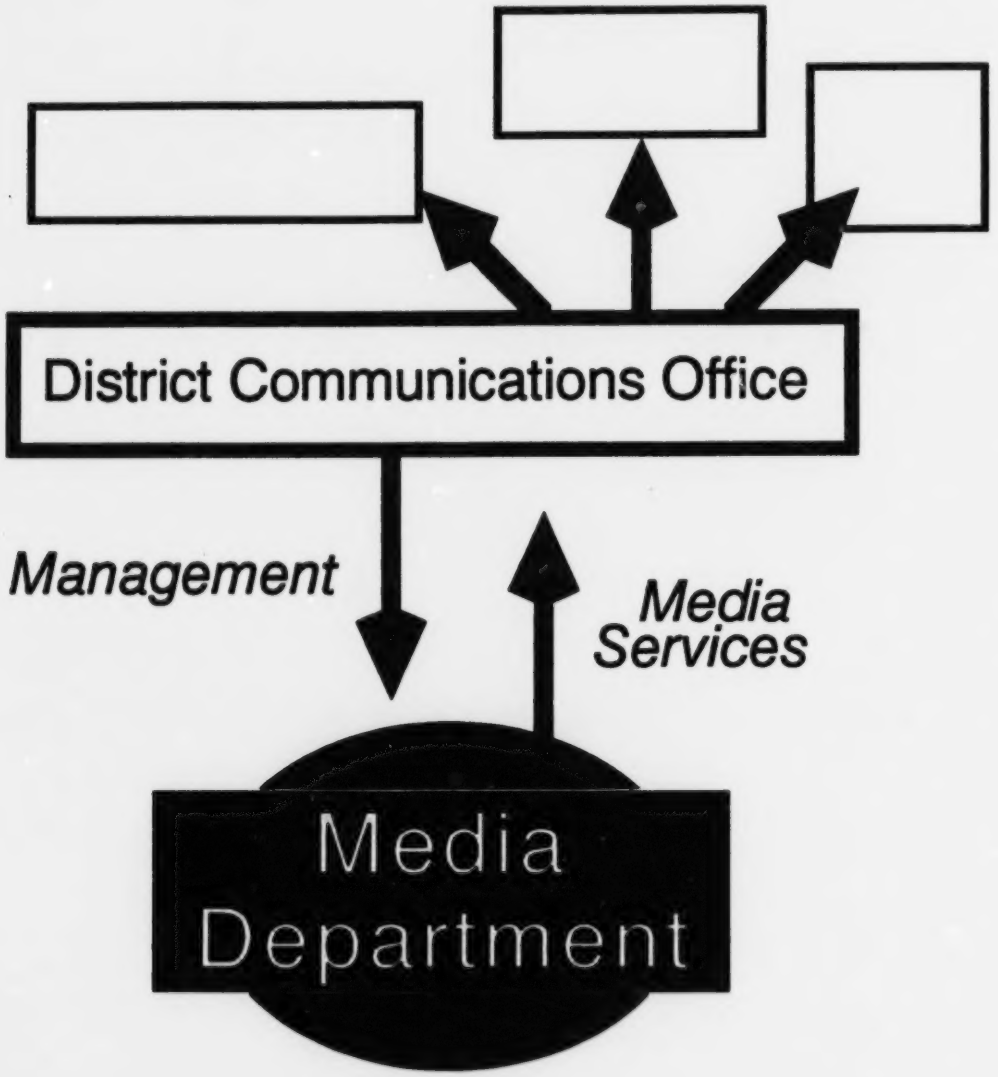


Dependent and Isolated



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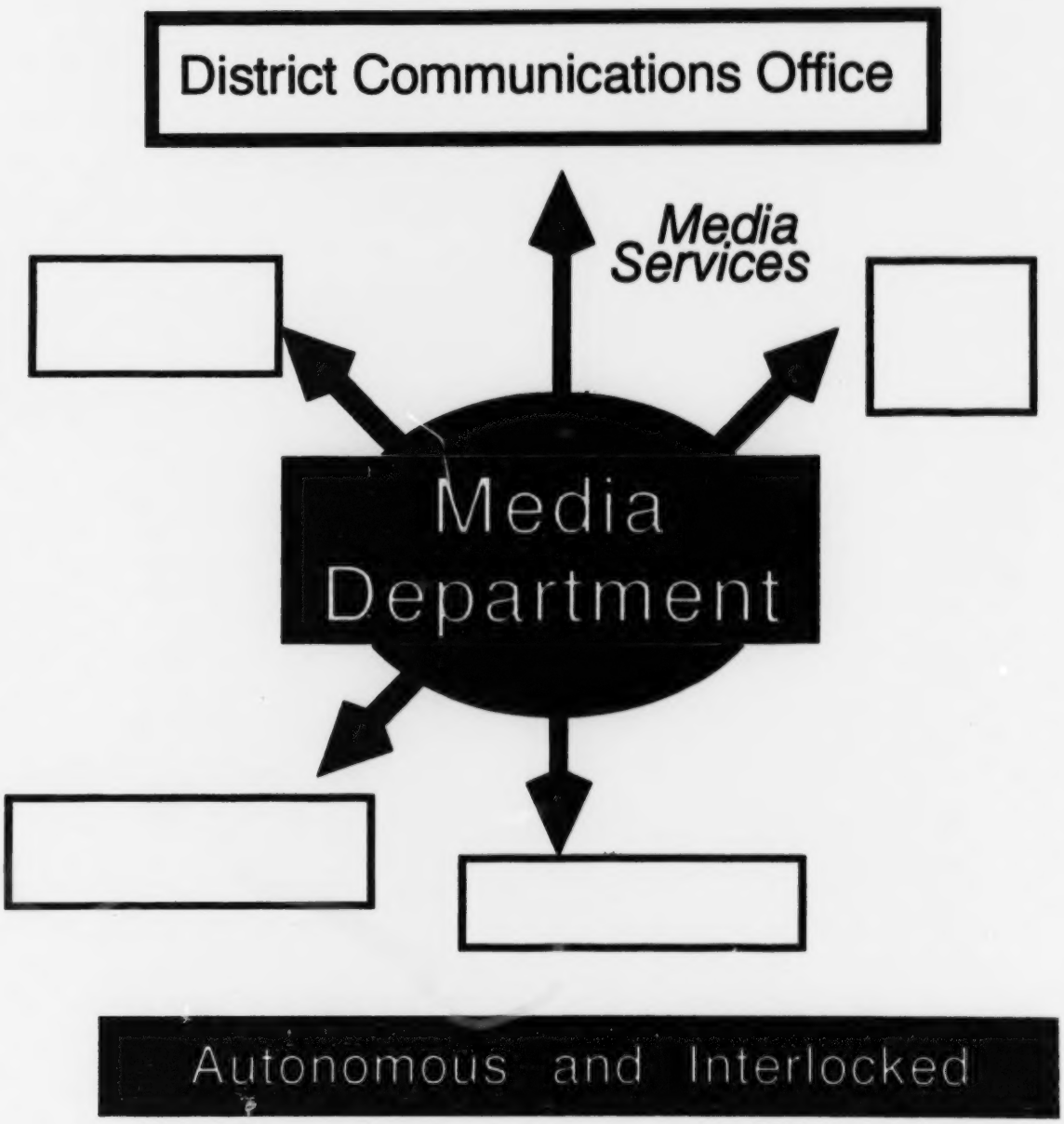
District Communications Office
Media Services
Media Department
Autonomous and Interlocked

AIMS CoPlanner: Computer software to facilitate preservice resource teacher education

A paper presented at AMTEC '93, at the University of Windsor, Windsor, Ont., June 15, 1993.

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AIMS CoPlanner: Computer Software to Facilitate Preservice Resource Teacher Education

by

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The Special Education resource teacher education program at the College of Education, University of Saskatchewan, has been in place since the late 1960s. During this time, the faculty has tried to keep the program current by periodically surveying our past graduates to find out how well we have been preparing them for their subsequent positions and what new elements should be added to our program. We have revised both our program and courses based on this feedback and on emerging directions in the field. The most recent survey, completed in 1988, produced three major recommendations for improvement to the program: 1) move the resource teaching practica from a university clinic-base to a regular school-base; 2) include more content on communication and other interpersonal skills required for teachers to work effectively in the "collaborative" model, and 3) prepare resource teachers to use computers in their work. Not only were these recommendations consistent with emerging practices in the field of special education, but our past students were emphatic in stating that these skills are essential to their professional roles.

Educational innovation often originates in situations like this, where there is a significant pressure for change and a critical mass of expertise available to focus on the areas of needed change. Both conditions were operational three years ago when we began revisions to our teacher preparation program. Several faculty members initiated Project AIMS with the goal of infusing technology training into the courses and practicum experiences of the newly designed program. A third factor, the project development support awarded by the Apple Canada Education Foundation, the College of Education, the Saskatchewan School Trustees Association, the Saskatchewan Teachers' Federation and Saskatchewan Education provided computer hardware and funding for the subsequent development of our software product - AIMS CoPlanner. AIMS CoPlanner became our theoretical and practical means of responding to all three recommendations of our past graduates simultaneously.

Assumptions Underlying CoPlanner

The first recommendation of our graduates, which was to prepare our current students to use computers in their subsequent resource teaching, was a considerable challenge. When we reviewed the literature, we found that the predominant model in North American colleges of education for preparing teachers to use computers was to require them, or allow them, to take a three semester hour "Computers in Education" course. In most instances, college faculty continued to teach their courses without using computers, leaving students to bridge the gap between **knowledge** about computers and the **use** of computers in teaching. In contrast to this prevailing practice, the Michigan Task Force Report (Norvak & Berger,1991) concluded that a better way to achieve computer literacy at the preservice level was to integrate computer use into every aspect of the students' programs and especially into their practica experiences. According to the Michigan Task Force, such an approach would greatly increase the probability of teachers using computers in their subsequent teaching. Troutman and White(1991) arrived at a similar conclusion, suggesting that faculty modelling of computer use and infusing technology into courses would best prepare teachers to use computers in their later work.

Our **primary assumption** in the development of AIMS CoPlanner was that it would be a computer-mediated decision-making model which we could introduce to our students initially in a

laboaratory setting, require them to use during their field practica, and then carry with them as a tool into their subsequent teaching positions. Our **second assumption** was that CoPlanner would serve as a cohesive bridge between theory courses taught at the university and school-based practica. That is, AIMS CoPlanner would facilitate the translation of theory and research studied on campus into decision-making, planning, and teaching activities during the school-based practica. Our **third assumption** was that, because CoPlanner was a tool to support collaborative resource teaching, it would also serve as a vehicle for teaching some of the interpersonal skills required for effective collaborative teaching. A **fourth assumption** was that, by integrating the use of CoPlanner into every aspect of the preservice resource teacher education program we would increase the probability of our students subsequently using the computer in their teaching (Norvak & Berger, 1991). After using CoPlanner for two years in our resource teacher education program, we find all four assumptions to be sound. Our students have demonstrated that they are competent in using the computer when they complete the program, they are using CoPlanner effectively in their practica settings, and several of our first graduates have continued using CoPlanner as field testers in their current resource teaching positions.

Design and Structure

Since AIMS CoPlanner was designed to foster both computer literacy and as a collaborative approach to teaching for our resource teachers-in-training, it includes several features related to each objective. First, it uses the Macintosh System 7 "Balloon Helps" to provide situational support while they are learning to use AIMS CoPlanner. More extensive help is provided through an on-line manual and an illustrated printed manual. The software itself consists of: a central **CoPlanner Worksheet** to support the task of cooperative instructional planning by an education team assigned to work with a student with special needs; a database of **Tools** to support assessment and teaching activities; an internal **Communication System**, consisting of Mail and Personal Notes, to facilitate the capture and exchange of ideas and information among team members; a **Report Planner** and **Generator** to support the formal and informal reporting of student progress; a **Thesaurus** to assist collaborating professionals in the development and use of mutually understood, clear terminology; and a **Security System** to protect confidential information. Further, CoPlanner is an **open** system, adaptable by the user to different curricula and team memberships; and, it is **question-driven**, with guiding questions typical of those asked by experienced special educators working collaboratively with other instructional staff.

Current Uses of CoPlanner

This is the second year of full integration of AIMS CoPlanner into the resource teacher education program at the University of Saskatchewan. Student course evaluations and our observations of their work in the school-based settings verify that novice computer users successfully learn to integrate the software into their work while in our program and continue to use it effectively after they have graduated.

CoPlanner is currently undergoing extensive and intensive testing at a number of field sites. It is being used for teacher education at four field test sites in the United States and by practicing resource teachers at 15 schools in British Columbia, 12 schools in Saskatchewan, 2 schools in the United States and 6 schools in Australia. The software is also being used by special education consultants/educational psychologists working in a collaborative model at 3 sites. We are obtaining formal evaluative feedback from all North American sites prior to the end of the 1992-1993 school year and from Australian sites in November, 1993.

Formative and Summative Evaluation

AIMS CoPlanner was briefly field tested at 6 schools during the Spring of 1992. Formative data from that time have been used as a basis for significant improvements to the software. The more extensive evaluation currently in progress will include both formative and summative

components. We are soliciting both teacher ratings of the current version of CoPlanner and suggestions for improvement of the software. An enhanced version of CoPlanner, reflecting evaluative feedback from field sites, will be completed by the Fall, 1993.

Beyond evaluation of the software design and operation, we are also collecting information about the impact of CoPlanner upon professional communication and roles, as well as the quality of instructional programs for students. We are interested in users' perceptions about the ways in which software such as CoPlanner shapes and influences the roles of team members and the quality of decisions made by the collaborating team. We anticipate that analysis of these responses will identify the software features that most enhance teamwork and collaborative instructional planning and delivery.

Anticipated and Unanticipated New Uses of CoPlanner

Even though AIMS CoPlanner was conceptualized and developed as a tool for special education resource teachers and classroom teachers, it is clear already that the collaborative instructional planning model incorporated into the software is generic enough to support the work of educational psychologists, speech therapists, counsellors, social workers, nurses, special education consultants and other support staff who work collaboratively with students with special needs. The questions which underpin the CoPlanner Worksheet reflect the planning and decision processes commonly guiding the work of instructional support persons, even though the answers would vary according to the professional background of the educator seeking to answer the questions.

We also see the potential for CoPlanner, or an adaptation of it, to be used to support the collaborative work done in transition planning for children and youth with special needs. The changes associated with movement from one educational or life situation to another have been identified as especially critical for students with special needs (Ianacone & Stodden, 1987). Planning and delivering effective transition programs requires that families and professionals work collaboratively, placing particularly high demands upon the collaborating team. The computer is ideally suited for capturing the on-going results of joint planning, of storing those results and making them readily accessible for all members of the team.

The professionals using the software in the field test sites have discovered novel ways to adapt CoPlanner to suit their needs. For example, one site has included older students as members of their own instructional planning team. These students learn about technology while they are engaged in self-directed learning and reflection. Another site has structured CoPlanner around the instructional groups operating in the classroom. This adaptation of CoPlanner allowed the team to carry out detailed planning on several target students simultaneously while receiving instruction within classroom groups.

Conclusion

Harnessing the microcomputer as a tool to support the instructional planning tasks of educators is an emerging, potentially powerful new area for study (Valdez, 1986). Writers and researchers such as Baker (1978) and Lillie, Hannum, and Stuck (1989) have maintained that Computer Managed Instruction (CMI) shows more promise for influencing educational outcomes for students than Computer Assisted Instruction (CAI). Recent trends toward teamwork and collaborative decision-making have provided a new context for the development of CMI research and development. AIMS CoPlanner is software for Computer Supported Education (CSE), a tool to support teams of educators in their planning, thereby indirectly supporting students in their learning. In that sense, CSE is a preferred approach to CMI, one in which the emphasis is on leaving educational decision-making in the hands of educators while using the computer to support such decisions.

Because CoPlanner was developed both for initial use in teacher education and subsequent use as a life-long tool for experienced resource teachers, there appears to be greater motivation for our students to learn to use the software during preservice preparation. Also, reactions from practicing educators indicate that even though CoPlanner was developed for teacher education, it is

seen as a highly valuable instructional planning tool for experienced resource and consulting support staff.

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A CAL PROJECT : MONEY SKILLS FOR THE INTELLECTUALLY DISABLED

BY

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ABSTRACT:

Computer Aided Learning (CAL) packages have been developed in large numbers since the late 1960's for primary and secondary school levels. Other packages have been developed for school administration at varying levels but few CAL packages have been developed specifically for the teching of the Intellectually Disabled. This paper describes the development and testing of a package for the teaching of Money Skills using Australian Currency which has application in the teaching of both intellectually disabled and able students. The package was been developed using the Turbo C programming language on IBM compatible microcomputers making use of high resolution EGA/VGA colour graphics.

The package developed has been tested with groups of both the intellectually disabled and able students of varying ages and ability levels. A statistical analysis of pretest/posttest mean gain scores using a control/experimental group design was then undertaken. This analysis indicates superior gain scores are obtained by both able and disabled students when the package is used in conjunction with the more traditional teaching methods. These results also indicate that superior gains may in fact be shown by disabled students with relatively small periods of time needed to be spent in interaction with the computer. The disabled students also appear to return to their normal classroom with a better 'attitude' after interaction with the computer package as developed.

Introduction

The latest studies of educational usage of computers appear to be in agreement with regard to the findings that traditional instructional methods **supplemented** by CAL leads to higher levels of achievement and retention levels than do traditional instruction methods alone. While a considerable number of packages have been developed for the science and mathematics areas of the curriculum a review of the literature concerning the intellectually disabled indicates that in comparison very little work has been done in CAL for the Intellectually Disabled. There has been some work undertaken in the area of Statistical Analysis of student performance which has been reported in 'Mental Retardation' but there appears to be a great lack of suitable packages for the Life Skills area of education for the Intellectually Disabled.

According to Hallworth [5], CAL has been shown to be very successful in dealing with persons with an intellectual disability. In particular Bunderson (In Molnar [8]) found that

lower-level students require longer periods of time with CAL than average or above-average students, but more lower-level students eventually reach their objectives than do traditionally taught lower-level students. This is supported by Tait, Hartley & Anderson [12] who found the greatest gains on a pretest/posttest basis for those students with low initial levels of achievement.

Many authors have reported one favourable aspect of the use of computers by persons with an intellectual disability is the increase in motivation that it provides (Dell and Aguilera [4]; Hannaford and Taber [6]; Conners et al [3]). Other favourable aspects which have been reported include, the computer is non-threatening (Fishman, 1976 cited in Wilson and Fox [16]), it gives individualized instruction, and is effective as a method of teaching (Conners et al [3]). In particular Dell and Aguilera [4] reported that teachers of a group of 15 children with an intellectual disability working on computers saw favourable changes in the children's behaviour at the computer.

Suitable CAL Programs

It was decided to concentrate on the area of Money Skills; ie. the recognition of coins and notes, identifying correct change, addition of money to a total, and a combination of all these skills to enable the purchase of items. In order to maximise the effectiveness of the programs, I endeavoured to include as many as possible of the characteristics given in the article by Wade [15]. The majority of programs available were either games of very questionable educational basis or programs which were not intended for students at this level of education.

Presentation Method Selection

An investigation was made of possible presentation methods and costs leading to an initial working program using CGA colour graphics for the coin and note icons and 40 column colour text presentation for menu items, instructions to user, and feedback to the user. The colour graphics for the icons were developed using bit maps and bit shifting to alter colours to minimise the display time. All keyboard input by the user was implemented utilizing function keys to minimise the need for user keyboard familiarisation and ease of use for selection from the bar type menus and cursor controlled icon selection.

These programs were trialled with able students of varying ages and reading abilities in order to test the flow of the program, ease of reading for instructions/feedback, and comprehension of the english used throughout the program. Initial trialling of the CGA version of the program showed that the selection of 40 column text was quite appropriate to enable the intended audience to read instructions etc. with a minimum of difficulty. However, the graphical presentation using CGA colour graphics was felt to be far too 'chunky' and limiting in terms of the restriction to a maximum of 4 colours per computer screen.

As a result of this 'feedback' from the users it was decided a complete rewrite of the program using EGA/VGA graphics with its choice of 16 colours per computer screen was necessary to enhance the recognition of the icons developed and allow the use of a greater range of colours for differentiation between instructions and feedback. Samples of the

computer screens are contained in Appendix I.

Also as a result of the trial of the initial CGA version of the program it was decided to investigate the utilisation of a voice synthesizer for all instructions and feedback to the user in order to minimise the level of reading ability required of the user and maximise the programs impact. An attempt to utilise the COVOX Speech Synthesizer (Text to Speech mode) was made before the program was rewritten with EGA/VGA graphics. Unfortunately, when this was trialled with able students their responses indicated the speech generated by the synthesizer was far too distorted even through the external speaker supplied with the synthesizer for the intended audience of intellectually disabled students to comprehend clearly and readily. As a result the sound generation incorporated into the rewrite was limited to simple sounds for feedback to the user to differentiate between a correct and an incorrect response, and, for three incorrect attempts at a problem presented. This generation was a single tone for an incorrect response, a short tune for a correct response, and, a bomb dropping for three incorrect attempts at the same problem.

Trialling of the Package with Users

The program was then trialled with able students of varying ages and abilities at various establishments to ascertain its applicability and the need for modifications if any. This included areas such as :

- ascertaining the reading age required for easy use and any additional instructions/help required in the program.
- consequent modification and re-trialling for ease of use.

This resulted in a general minimum reading age of year 2 being required for a user to comprehend the instructions embedded in the program.

The package was then trialled with a group of 10 students from a Special School in the Western Suburbs of Melbourne over a period of four weeks. All students were initially tested using the package to ascertain their levels of ability before trialling began. Subsequently a group of five students were given four sessions of approximately twenty minutes duration using the package on a one to one basis in addition to their normal classes, while the remaining five students had only normal classes. At the conclusion of this period all ten students were again tested using the developed package to ascertain their ability after trialling.

As the number of students tested from the special school was only 10, it was decided to trial the package with a group of 28 able students from a Private College in the Western Suburbs of Melbourne. This group was selected rather than another group of intellectually disabled students due to the integration of the intellectually disabled into ordinary schools resulting in groups of only 1 or 2 students being available from any one school.

The resulting statistics gathered from pre and post tests were then analyzed with particular emphasis on *t-tests* of the students *gain scores* in order to gauge the educational usefulness of the program in conjunction with more standard teaching methods. The results of these analyses are summarised in Table 1.

Table 1 Statistical values calculated from Test results.

(a) Intellectually Handicapped students

	Coins	Notes	Adding	Change	Buying
	Cont. Expt.	Cont. Expt.	Cont. Expt.	Cont. Expt.	Cont. Expt.
Mean Gain	3.2 1.2	3.6 0.8	10.2 0.4	6.0 0.0	3.6 0.0
t	1.77	2.21	9.8	10.95	14.70
p	0.058	0.029	0.000	0.000	0.000

(b) able students

	Coins	Notes	Adding	Change	Buying
	Cont. Expt.	Cont. Expt.	Cont. Expt.	Cont. Expt.	Cont. Expt.
Mean Gain	0.0 0.0	0.0 0.0	3.1 0.2	4.1 0.3	5.5 0.9
t	N/A	N/A	4.22	6.47	10.21
p	N/A	N/A	0.000	0.000	0.000

The analysis of the results of the trialling indicates that considerable gain is shown by both intellectually disabled and able students with minimal usage of the developed package in conjunction with standard teaching methods. The results indicate that the use of the computer package in conjunction with standard teaching methods definitely has a differential effect on the gain score of students.

Implications of the Research

This research has shown statistically significant improvement in the skills of both intellectually disabled and able users in a short time span of usage. The package as developed has also shown that while CAL has in the past been directed at 'able' students there is a growing need for more packages to be either modified for use with the intellectually disabled or in fact to be tested for their suitability and effectiveness in this area of education. This suitability should not be limited to improvements in skill levels but should also take into account any improvement to the attitude and/or behaviour of intellectually disabled students.

APPENDIX I

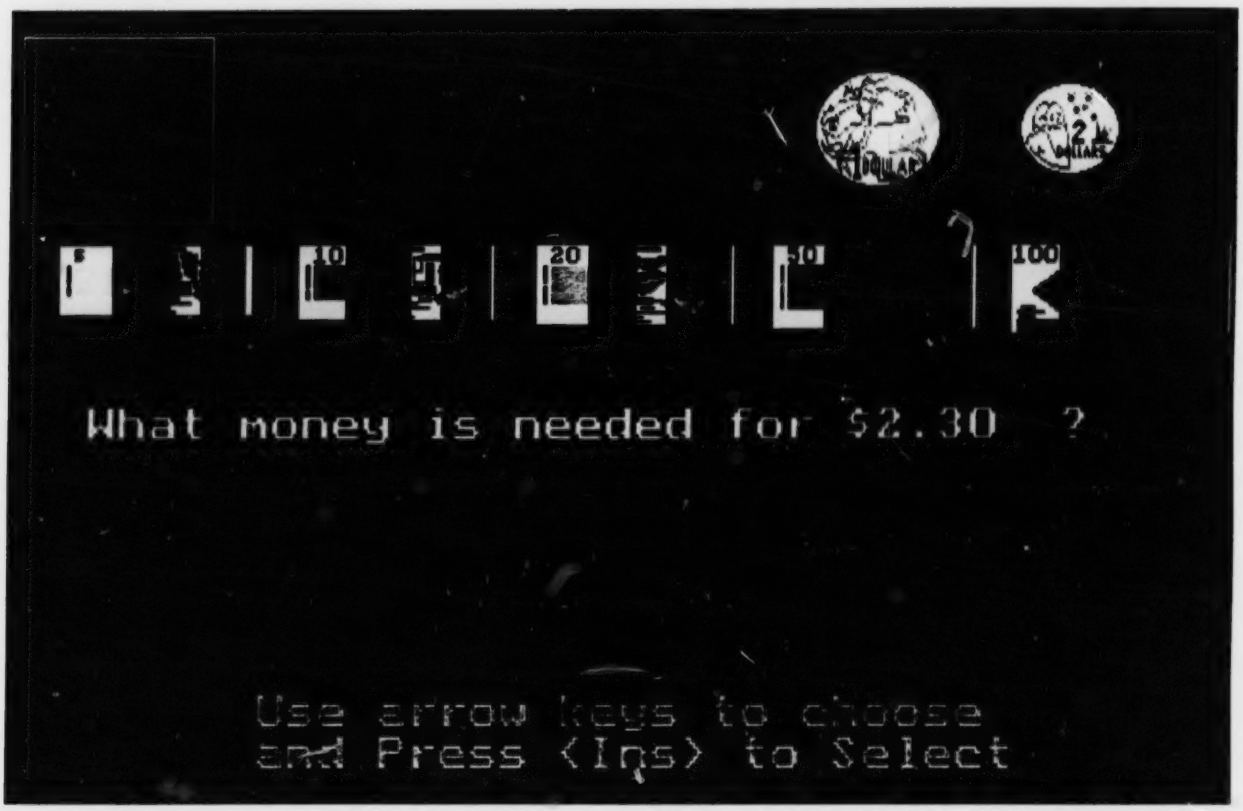

Figure 1 : Screen for Selection of Money to Add to a Total in FINAL program.

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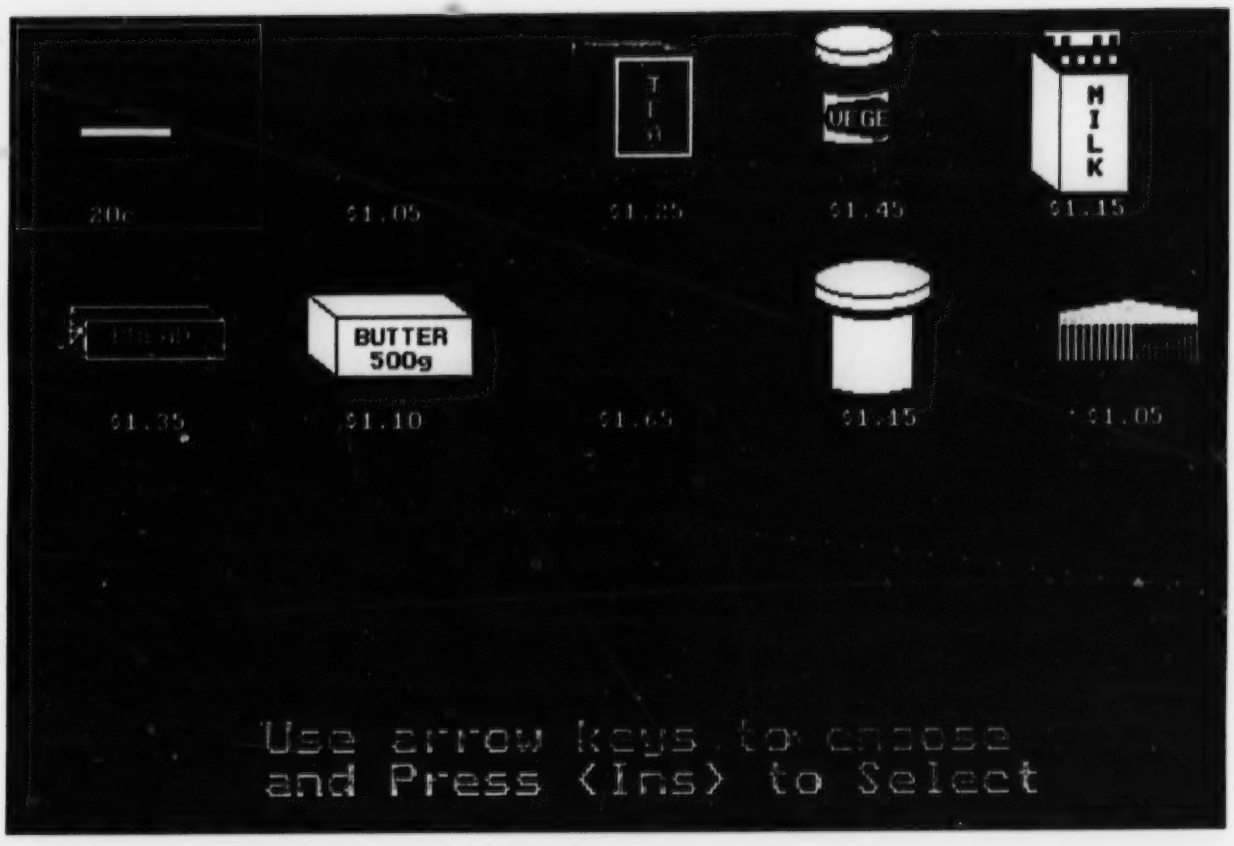

Figure 2 : Screen for selection of items to buy in FINAL program.

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The Role of Instructional Design and Information Development in Guiding Technological Change:

Lessons Learned From a Large Scale Office Automation Project

By

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and

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Purpose

The intention of this paper is to help practitioners better guide organizations implementing technological change. Our insights are distilled from experience and, in particular, from a project we worked on through most of last year. In addition to insights about implementing technological change, we also made some interesting observations about our own professional practice. As an instructional designer and an information developer, we both realized that our disciplines are complementary in their methods, tools, and techniques. This paper will also explore this relationship and draw some conclusions about the role of each in similar kinds of projects.

Background

This section provides the background to the case. Included are a brief overview of the project and a description of the roles of the authors.

The Project

The project extended over a six month period and was driven by a larger initiative of the client's Management Information Systems (MIS) department. The strategic initiative was a six year plan to automate the administrative functions of the organization. The initiative included plans to design software for each division in the organization and was financed by a provincial government fund for the automation of administrative functions and by the company itself. The M.I.S. department made all decisions related to budget allocation. The MIS department's preeminent role in the project is telling. It demonstrates the extent to which this initiative was viewed as an engineering exercise. Human resource functions such as training were given no special budget for the project.

The first step was to put a personal computer (PC) on the desk of 4,000 employees. Each PC would be equipped with a set of software run from Microsoft Windows[1]. This "Rollout" of hardware and software was to be undertaken in stages. The first was at a regional office and the second was in the Marketing Department at head office. Each rollout was expected to occur over a three month period.

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[1] Windows is a trademark of Microsoft Corporation.

A Rollout team was established to guide this initiative. The team included managers from the MIS department and one manager from the Training department. The Windows suite was selected by the Software Planning department. These selections were based on the corporate performance of the software producers.

Roles of the Authors

The authors participated in this project as consultants employed by a Computer Documentation and Training company (CD&T)[2] This project was the first project of this size undertaken by CD&T. The authors had no previous experience in collaborating, nor had the CD&T established any policies or procedures to deal with a project of this kind. The CD&T team members were assigned to specific project deliverables. The team was composed of eight members. Three members on the team had specific experience in both information development and instructional design while the remaining five members were hired with little experience in either discipline.

What We Were Brought In To Do

This section of the paper describes in detail the tasks we performed during the project. These included: project management, documentation, training and evaluation.

Project Management

The first area that CD&T was mandated to cover was in the project management of the Rollout. Members of the Rollout team met once a week to discuss the project management plan as well as issues relating to their respective responsibilities. CD&T had a representative on this team who's primary purpose was to document the meetings and maintain the project plans.

Documentation

The following describes the documentation, its purpose and the methods used to determine the content of the documentation

[2] To maintain the anonymity of all players, the names of all organizations and people are fictitious.

Description

We were contracted to provide two types of documentation: marketing literature and Windows-support guides. The Rollout team referred to the marketing literature as "Deskdrops". They announced that the PC's were coming, when the software would be demonstrated in that region of the organization and when training would be held. The Windows documentation consisted of Quick Reference Cards and a User Guide.

Purpose

Our client perceived that users needed both an announcement about the coming of the PCs and documentation to assist the users after they were trained. The need for both the marketing literature and the computer documentation was identified by the Rollout team. The Windows-support guides were intended to assist the users in using the Windows Suite software. The support guides would accompany user documentation packaged with the software.

Methods

Interviews with the Rollout team were used to identify the content of the marketing literature. This production was narrowly defined and therefore took little time to produce. The literature was sent out before both the Regional and Corporate rollouts.

Two levels of analysis were used to identify the content of the computer documentation. The first was a textual analysis of the existing Windows documentation and the second was an analysis of the problems users had experienced in using this software in the past.

The textual analysis proved that the existing documentation was entirely sufficient as a resource tool. We suggested that they buy a set of documentation for each employee. The Rollout team rejected this idea. They didn't want to spend that amount of money on documentation. We also suggested that the users could benefit from a user guide that was customized for their environment and addressed real-life problems.

We needed empirical data to define the problems that the user guide would address. We asked for information from their "Help Desk" but learned that descriptions of users' problems were not documented. Only information about the number of calls handled by the "Help Desk" was kept.

Training

We were contracted to evaluate the computer training for the new hardware and software. The following provides a description of our mandate, as well as, the methods used to evaluate the training for our client.

Description

Our client recognized early on that training would be an important aspect to the PC roll out. Training was conceptualized solely in terms of discreet courses around new software products such as Microsoft Windows and Amipro (a word processing program). Logistical concerns were paramount. How many course should be offered; when should they be offered; and to whom should they be offered, were the main questions driving all the training initiatives. Of secondary importance were concerns about quality control. As the courses were to be sub-contracted to a company specializing in software training, our client wanted confirmation that these courses were satisfying the requirements of their employees.

Methods

Our client, therefore, asked us initially to perform two tasks. First, to help identify who should take a particular course and second, to assess the training courses offered by the outside contractor and recommend any necessary modifications.

A number of concerns immediately sprang to mind. First and foremost the instrument being used to gather information from employees was clearly not a needs survey. It asked employees to pick and choose training courses for new software packages while what was required was a thorough task analysis of the organizations job functions and then a matching of these tasks with appropriate software tools. Since time was very limited we worked with our client to modify the needs survey. Instead of asking employees to select "needed" software products the new version of the survey listed generic tasks that a particular software tool would aid in and asked employees to select those tasks they felt they would perform most often. Based on their selections, employees were then assigned to specific training courses.

The second concern was that the data coming from a task analysis should also be used to drive the training design. The courses being offered by the outside company were generic in nature and hence did not reflect the tasks employees performed on a regular basis.

The course evaluations were undertaken over a 6-week period. Data was collected in 3 ways. First, an expert review of each course was undertaken. This review assessed the design of each course with respect to accepted principles of instructional design.

Second the perceptions of learners about the courses were assessed through surveys and focus groups.

Evaluation

The project management of the Rollout, documentation and training requested an evaluation of how users currently performed their jobs, how their jobs would be transformed by the introduction of technology and the new skills that this transformation would entail. We tried three avenues to get at this information.

First, our client claimed to have access to this information. They had software that was dedicated to collecting information about the actions of their employees. One complaint that we heard many times over was that it was far to difficult to access this information. Also, it became apparent that this information was purely quantitative.

Second, both the course evaluations and needs survey redesign offered us an invaluable opportunity to raise some difficult questions with our clients about their approach to training and documentation. A number of major issues emerged. First there was little connection between what staff were doing on the job and the skills and knowledge they were acquiring during their courses. For example, participants in a word processing course would learn all the basic commands but would never have the opportunity to practice these skills producing a memo to company specifications. Everyone who indicated a need to use a particular software package received the same generic training regardless of the task they would use the software to help complete. Second there were many co-requisite skills and knowledge that employees need to master in order to use the software tools to their full potential. For example a knowledge of basic principles of graphic design is necessary if one is to use presentation software effectively. Similarly, a knowledge of basic graphing techniques may be necessary if one is to effectively use a spreadsheet program like Excel. The course evaluations also reaffirmed our belief that our client needed to determine how software functionalities meshed with employee job functions. In other words they needed to clearly determine the training and information needs of staff rather then their training and information wants.

Third, our client asked us to conduct client needs interviews. As was the case with the clients needs survey, needs were never addressed. The Client Needs Interviews were used to accumulate data on the tasks that the employees would perform with the software in their day-to-day operations. The final report was a matrix that matched

on-the-job tasks against the Windows software suite. The final results were summarized in a letter to the Director. It is significant to note that this was the first time a tasks analysis had been conducted on the job functions of the Utility Corporation.

Summary

In summary, we conclude with lessons learned about technological change within a large organization as well as lessons learned about the roles of information development and instructional design in facilitating this change.

Lessons Learned About Technological Change Within an A Large Organization

Our clients choice of software was based on the corporate performance of the software producers. Instead, the choice should have been based on the tasks employees performed or might perform in the future, the software's ease of use, and how easily the software would accommodate existing practices of the employees.

An explanation of how the new software would improve the way people would work was not well communicated to the employees. There appeared to be little understanding of the new corporate vision among the grassroots of the organization.

The Rollout may have been more successful if it had occurred by functional group rather than by region. There were some functional groups, such as sales, that were a good fit with the new tools. There were obvious ways they could perform that same task with enhanced productivity as well as performing new tasks. These gains could have been used to show case the technology for the rest of the organization. Also, regional rollouts created a great deal of disruption because every function in the region was affected.

Human resources needed to be a key player in the process from the start. They have knowledge about the nature of peoples' jobs and how people respond to change. While training was recognized as a key player in the process, they were not given the resources to respond in an effective way. Training for new tools needs to viewed within the broader context of skill and organizational development .

Finally, grass roots involvement during the planning stage is vital. In this case, there were no representatives from workers or line management involved in planning the Rollout. This led to the planning team not receiving valuable advice about how to implement the rollout but also represented a lost opportunity to foster good will.

Lessons Learned About the Role Information Development and Instructional Design in Facilitating this Change

Front end analysis is a crucial step in implementing technological change. As information developers and instructional designers we were well qualified to carry out this kind of analysis. Unfortunately, we were only able to conduct a front-end analysis in an iterative fashion.

We also learned what kind of information to include in a front-end analysis for technological change. Information about how an organization's employees have coped with technology in the past should be a key component. While our client did run a help desk they failed to capture the kinds of problems users were having rather they kept track of data about how fast they responded to a customers request. In addition, once a mechanism is in place to capture the effects of technology through a front-end analysis, it could remain in place as a part of day-to-day operations. Changes to these effects could be logged, thereby creating a historical record of the entire change process.

The practice of both instructional designers and information developers dictates that front-end analysis is a crucial part to the design of effective deliverables. However, in this case we found ourselves placed in a situation where we were initially blocked from undertaking such an analysis. We therefore chose to collect data and pose questions in a more incremental fashion as we developed the products asked of us. While not an ideal situation, this approach did ultimately allow us to raise crucial issues and concerns .

Finally, if one is assembling a team of professionals to help in effectively implementing new technology in an organization, an information developer and an instructional designer are key players. Information developers bring tools and techniques to structure information about how to use new technology that is easy for users to follow and can be accessed quickly once a problem arises. Instructional designers bring tools and techniques that provide users with necessary practice and feedback so that new skills and knowledge are quickly mastered.

LEARNING IN THE WORKPLACE: AN INTEGRATED APPROACH

by Miria Ioannou, Program Director, Frontier College

Introduction

Learning in the Workplace (LWP) is a program of Frontier College, one of Canada's oldest adult education organizations. The goal of LWP is to enable employees to meet the growing literacy demands placed upon them in their workplace. The program's premise is that existing resources in workplaces can be used to increase the literacy skills of employees. LWP staff have developed methods, training materials and workshops to enable organizations to implement their own workplace learning programs.

LWP is also based on the premise that any workplace literacy program should be integrated into existing training whenever possible. To this end, LWP trains company trainers, supervisors, personnel managers and human resource directors to incorporate literacy into everyday training and working activities.

Workplace literacy programs reach beyond work. While personal literacy goals, such as reading to children, may not have a direct bearing on productivity, safety or profitability, there are still benefits for the workplace. The individual attention of a peer tutoring system can strengthen self-confidence, increase participation in all areas of working life, improve self-esteem and competence, and increase employee demands for involvement and fairness.

By demonstrating commitment through time off, resources, and money, companies give a powerful affirmation about the value of individual employees. A literacy component can be the underpinning for an organization which truly understands the need to develop a learning culture among its employees.

Implementing a workplace learning program

The Organizational Needs Assessment

Before implementing a workplace program, Frontier College carries out an Organizational Needs Assessment (ONA). This process determines where the organization's learning needs are and makes recommendations for addressing them.

The ONA consists of a series of interviews of about 10 percent of the workplace population. Customized interview forms are developed for senior managers, human resources personnel, trainers, middle managers, supervisors, union representatives

and workers. Information is gathered confidentially and voluntarily. Rather than focusing on "literacy" and "reading," employees are asked about their learning and training needs and experiences. This informal process provides individual insights and can also determine how well the vision of senior management is making its way to the entry level. In addition, it can evaluate how well the needs and concerns of the shop floor are being expressed to senior management. What results is often a fairly accurate picture of the organization's learning culture. Once the information has been gathered, it is compiled into a report.

Using this information, LWP recommends a range of options for the company. The aim is to provide a continuum which includes in-house tutoring programs, assistance in developing learning materials and training of trainers in literacy issues. Frequently, clear language training is also recommended, particularly where people with technical expertise are suddenly involved in training or communication.

Setting up an in-house tutoring program

An in-house tutoring program involves workers tutoring each other, on a volunteer basis, on specific workplace-related literacy and numeracy skills. It can also include tutoring on personal literacy skills that a student may have identified.

LWP works with a company coordinator and a Learning Committee to design a recruiting process for students and tutors that best fits the organization. Promotional material often avoids the use of the words 'literacy' or 'illiteracy' since they can be very stigmatizing and may deter people from participating. Words such as 'skills upgrading' or 'communication improvement' are more encouraging.

Once students are recruited, they are interviewed to determine what they are interested in learning. This is done within the context of the ONA and the organizational learning gaps that it has identified. They are also asked what kinds of literacy or numeracy skills they would like to acquire in their personal life.

Tutors are also interviewed to determine what areas they would like to tutor in and how this fits with the overall company plan. LWP trains the tutors over an 8-hour session or two 4-hour sessions. The major focus of the training session is for tutors to see themselves as facilitators of the learning rather than teachers who are going to impart knowledge. Key adult learning principles are introduced such as: everyone can learn, learning is an equal exchange between tutor and learner, adult learners have a good sense of what they want to learn, and many adults learn best by being involved and by doing.

Students and tutors are then matched and meet at least one hour a week. Half of the time is on company time and the other half is on their own time.
Both students and tutors make at least a three-month commitment to the program

and be prepared to devote some personal time, in addition to what is being given by the company to prepare for sessions. Tutors also report to the company coordinator on the progress being made. Students agree to take an active part in lesson planning, goal setting and in contributing ideas and materials to the sessions.

The students are asked to set a goal which is then broken down into manageable steps that guarantee success. If the student has difficulty identifying larger, job-related learning needs, the tutor can help do an on-the-job learning needs analysis. This process involves examining the daily work routine by looking at where orders and information come from and where finished work and information go to. They also look at written materials and writing requirements and the skills involved in using these materials.

The Learning Committee

In implementing any learning initiative, LWP recommends setting up a Learning Committee. This collection of 6 - 10 employees acts as a sounding board for the experiences of program participants. The committee helps to identify new or important education and training issues, and suggests ways in which tutors and learners might include such workplace materials in their work together. The committee also takes a lead role in promoting the program through all areas of an organization. In addition, it acts as an advocate for the needs and interests of participants, ensuring that the program remains student-centred and satisfying for those involved.

Throughout the whole process of implementing an in-house tutoring program, LWP is training and offering support to the company trainer and the Learning Committee on operating such a program on their own.

Maintaining a program

Because volunteer programs usually need a great deal of support, it is very important for the company coordinator to be prepared to do some renewal and re-energizing. Some indications of the needs for renewal include: the participants are losing interest; they find the workload too heavy; they wonder if they are accomplishing anything; they are not enjoying the sessions.

There may be a number of reasons for these problems: the goal setting may have been too vague; student or tutor progress was not reviewed often enough; materials used did not reflect the student's interests.

In response, the coordinator should consider: reviewing and clarifying the learner's and tutor's objectives; reviewing the progress made; discussing the material being

used; rematching students and tutors if warranted.

Evaluation

To determining the effectiveness of a tutoring program, the following questions may be asked:

- Are students meeting the goals they have identified for themselves?
- Is there a review of the organization's priorities or areas of concern identified in the ONA?
- Are some students moving on to more formal types of education or upgrading?
- Have students kept a written log of material they have worked on so that they can keep track of the progress they have made?
- Have superiors or co-workers noticed differences in the student's job-related literacy skills or performance?

Conclusion

Learning in the Workplace has implementing a number of programs in different types of companies. Its strength lies in the following areas:

- It gives companies the skills to run their own learning or literacy programs.
- It shows companies how to integrate these programs into existing training opportunities.
- It fosters a culture of learning within the organization.
- It allows employees to help each other thus improving morale.
- It is cost effective.

AMTEC'93

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GRADUATE DISTANCE EDUCATION; A PILOT EXPERIENCE

M. F. Kennedy, D. P. Janes, & B. A. Park

Introduction

This past year Memorial University of Nfld. implemented its first graduate distance education course. The course - L6521 Instructional Development - is a required course on three programs leading to a Master of Education degree and one program leading to a Master of Nursing degree. It is also an approved elective course on a number of other Master of Education programs.

L6521 Instructional Development has been offered for approximately twenty years, with the current instructor having taught the course nearly every semester for the past ten years, including summer semesters. The instructor noted that there has been a significant increase in graduate student enrollment during the past decade. Because so many graduate students complete their degree programs on a part-time basis, there has been growing demand for evening and summer sections of the course. This factor, coupled with the need to provide courses to those graduate students residing beyond driving range of the university and a more liberal attitude toward distance education by Memorial University's School of Graduate Studies, persuaded the instructor to investigate the possibility of offering the course via distance education. Approval to design the course for delivery via distance technology was eventually granted in 1991.

Course Design

In designing the course for offering via distance, the instructor and two research assistants formed an instructional development team. Rather than beginning with the existing course and making adaptations, they determined that it was timely to review and re-establish first principles, since the course had been offered for approximately six years with only cursory student evaluations as an indicator of success. Hence they began at the beginning and followed an instructional development model to design the distance education version of the course, in accordance with Reigeluth (1983): "As a professional activity done by teachers and instructional developers, [instructional design] is the process of deciding what methods of instruction are best for bringing about desired changes in student knowledge and skills for a specific course content and a specific student population" (p. 7).

There are no undergraduate level instructional development courses at Memorial University of Newfoundland. Therefore from a content perspective the graduate course is at a fairly

basic level, typical of numerous beginning graduate courses offered across North America. Students are introduced to the basic principles of instructional development from a theoretical and an historical perspective. They then apply that knowledge in the development and evaluation of instructional modules for their particular work settings, which include community colleges, schools of nursing, business and industry training departments, and government training departments, in addition to the formal school system.

In designing the distance education course the instructional development team selected as an instructional approach the audio-tutorial system of instruction developed by Postlethwait in the early 1960s. This system of instruction is very flexible, allowing the integration of a variety of media and methods (Postlethwait, 1977). The resulting course included the following components:

(a) a set of 12 audiotaped armchair lectures recounting the thoughts and experiences of the instructor as a practicing instructional developer;

(b) a set of 4 videotapes introducing the course developers and dealing with the core of the development process - task analysis, objectives, and testing;

(c) a programmed instruction textbook designed to assist students in working through the instructional design process at the applications level;

(4) a book of readings containing 12 articles and a course textbook, both of which provide students with the theoretical constructs underlying instructional development;

(5) audio teleconferencing for 2 sessions to permit the students to interact with the instructor and with each other.

Course Evaluation

Throughout the course development process the instructional development team performed a considerable amount of preliminary evaluation activity, mostly through appraisal by those with particular expertise, through step-wise replication (Guba & Lincoln, 1981), and through consultation with various interest groups. A comprehensive evaluation of the pilot offering was also planned. It was decided to use as a general framework for this evaluation the responsive approach as delineated by Stake (1976).

Stake (1976) suggests that evaluations should be guided by the questions, concerns, and issues of all those groups having any stake in a given program: in the case of educational programs there may be numerous groups of stake-holders. In nearly all cases identified groups would include program administrators, teachers or instructors, students,

and program or course developers. It is the specific information needs of all such groups that guide data-gathering activity in a responsive evaluation.

Stake's model emphasizes the non-linear nature of evaluation activity, and while common activities are identified, Stake tries to ensure that evaluations do not lapse into linearity by placing his 12 recommended activities in a circular diagram. He emphasizes that the evaluator may move among activities in any order and even revisit certain activities throughout the evaluation time-span.

For the evaluation of L6521 Instructional Development the authors based their evaluation design on the work of Lertpradist (1990). In her thesis entitled A Study of the Application of a Selected Evaluation Methodology in an Extension Setting she modified Stake's Responsive Model. Her modifications resulted in an evaluation comprised of the following eight activities:

1. Identify audiences/stakeholders and program scope;
2. Identify audiences'/stakeholders' concerns, issues, questions;
3. Set evaluation standards;
4 Select and develop instruments/methods;
5. Analyse audiences'/stakeholders' concerns, issues, questions;
6. Observe program transactions and collect data;
7. Apply standards and evaluative criteria;
8. Summarize data and report results.

Evaluation Implementation

The evaluation methodology being that of responsive evaluations, the evaluator focused on data collection instruments and techniques that would, for the most part, result in qualitative data. Stake (1976) emphasizes that the evaluation activity should occur in as natural a setting as possible, using the language and communication strategies of the audiences where possible. The evaluator chose to use a combination of the following techniques:

(a) analysis of course development and course implementation documents and records;
(b) questionnaires to elicit audiences' concerns and issues, demographic backgrounds

of students, and student attitudes about the course experience;
(c) interviews with various audience group members and students;
(d) student pretests and posttests.

Data were collected over a five month period, commencing approximately one month prior to the beginning of the course and ending two weeks after the course had finished.

The pilot offering of L6521 Instructional Development took place in the Fall semester, 1992. Enrollment was capped at 15 students for this first offering, and the course was fully enrolled at the beginning of the semester. By the end of the university's official drop and add period, 13 students remained in the course. The students represent all geographic regions of the province, and are representative of the variety of backgrounds of those pursuing graduate degrees in Education (See Table 1).

Table 1. Student Demographics of those Enrolled in the Pilot Offering of L6521 Instructional Development

Range of Age	
Under 25	1
25-30	4
31-40	3
41-50	4
Over 50	1
Sex	
Female	9
Male	4
Location	
St. John's	1
Avalon/East Coast	3
Central	3
West Coast	1
North Coast/Labrador	5
Degrees Held	
Two Degrees (B.Ed. + B.A.)	3
(B.Ed. + B.Sc.)	1
(B.Ed. + B. Spec.Ed.)	1
One Degree (B.A.Ed.)	5
(B.Ed.)	3

Stakeholder groups identified by the course evaluator include these students, the course developers and the instructor, the administrators within the School of Continuing Studies, the Faculty of Education, and the School of Graduate Studies, and the Learning Resources Program Group (the academic unit in which instructional development courses are housed).

Through the means of open response questionnaires and interviews the concerns and issues of all stakeholders were elicited before the course actually began. Concerns and issues were collated by the evaluator and the following categories were identified:

Administration	(delivery system suitability/access, support required, accuracy of materials, timeliness of interactions/feedback between students and on-site coordinator/course instructor, access to materials/library holdings);
Design	(quality of design/development of materials, evidence of instructional development framework, evidence of needs assessment);
Evaluation	(feedback on student evaluation forms, performance of students, appropriateness of distance format for course content, grades of students);
Communication	(adequacy of communication between students and instructor, ability of students to interact with each other);
Course Level	(maintenance of standard in terms of graduate course level, equivalency with on-campus graduate courses, attainment of course objectives, workload and personal initiative issues).

Based on the concerns, issues, and questions of the various stakeholder groups, a comprehensive set of evaluation standards were developed. Evaluation standards are used in the making of judgements. They are the measuring stick against which results and findings are compared. The standards are as follows:

Standard 1. There is evidence of an instructional development framework in the course design and materials.

Criterion 1:	Presence of clearly delineated objectives
Criterion 2:	Student evaluation based on objectives
Criterion 3:	Presence of task analysis
Criterion 4:	Content development guided by task analysis
Criterion 5:	Evidence of needs assessment

Standard 2. There is administrative and logistical support for the course.

Criterion 1: Materials are received on time
Criterion 2: Mail response time is acceptable to students and instructor
Criterion 3: Teleconference component is scheduled appropriately
Criterion 4: Materials are error free
Criterion 5: Turnaround time on assignments/feedback is adequate

Standard 3. The course results in positive cognitive outcomes.

Criterion 1: Achievement on examinations/assignments
Criterion 2: Comparative final grade results with past offerings

Standard 4. The instructional materials provide comprehensive content coverage.

Criterion 1: Effectiveness of materials as judged by students
Criterion 2: Adequacy of content coverage in relation to assignment/examination preparation
Criterion 3: Effectiveness of materials as judged by Learning Resources Program Group
Criterion 4: Professional/technical quality of materials
Criterion 5: Adequacy of student feedback mechanisms in instructional materials

Standard 5. The course results in positive affective outcomes.

Criterion 1: Student feelings regarding the distance education course experience
Criterion 2: Student attitudes re self-directed nature of the course
Criterion 3: Student attitudes re built-in student control of timing and pacing

Standard 6. There is evidence of suitability of the evaluation measures of the course.

Criterion 1: Suitability of 3 minor course assignments in relation to objectives
Criterion 2: Effectiveness of 3 minor assignments in terms of their contribution to the major assignment
Criterion 3: Suitability of the major assignment in relation to the course objectives
Criterion 4: Effectiveness of the final examination in measuring the theoretical content of the course

Evaluation Results

Data from all instruments included open-ended responses in the audiences' own terms and responses on Likert-type scales. The data were analysed and collated in frequencies and percentages, while open responses were analysed using semantic content analysis in accordance with Krippendorff (1980). Analysis of course documents and records and responses to open-ended questions in both interviews and questionnaires were categorized according to inherent meaning and the results reported descriptively where possible.

This section presents results from all sources. The results are classified according to the six evaluation standards and their criteria, which in turn were developed by the evaluator based on the identified concerns and issues, or information needs, of the various audiences.

Standard 1. Instructional Development Framework. Evidence of an instructional development framework in the course design and materials was plentiful. An examination of the course manual disclosed that a comprehensive task analysis had been done incorporating all areas of course content, objectives were clearly stated and covered all course content, and objectives were clearly related to the evaluation measures employed in the course. In fact the descriptive evaluation notes provided to students in the course manual indicate which particular objectives are being tested by each specific evaluation measure. The development of the course was also in response to a needs assessment performed on a provincial level.

Students were aware that the course was developed in accordance with an instructional development framework. Responses on a Likert Scale indicated that all students were in agreement that the instructor, through the course materials, made it clear what the course expectations were from the beginning of the course, that the course was well organized and thoroughly planned, and that the content coverage reflected the course objectives.

Based on the results of the data analysis, the evaluator judges that Standard 1 has been met.

Standard 2. Administrative/Logistical Support. Examination of the on-site coordinator's records indicated that materials were received by students on time at the beginning of the course. The one student who had a considerable wait for materials had failed to notify the administrative unit in charge of materials distribution that his address had been changed. In terms of materials quality, overall the quality was deemed to be high as indicated in student questionnaires and interviews. However minor problems were noted. The videotaped programs were out of sequence on two tapes, the sound quality on one set of audiotapes was poor and one audiotape was blank on both sides. The lack of counter markings on the videotapes also created difficulty in accessing the specific video programs.

Students were asked to comment on various aspects of the course materials such as length, suitability in relation to course objectives, content organization, appropriateness of media/format and professional quality. Responses indicated that students were very positive for most of the materials. All students rated the programmed instruction text, the book of readings, the videotapes and the audiotapes highly. Only two students indicated any need for improvement in these components. The academic unit responsible for duplication of these materials uses one videotape for all four video programs and four audiotapes for the twelve audio lectures - students suggested that some indicator of each program start and finish be developed.

The commercial textbook did not receive such a positive rating. Approximately half of the students thought that the textbook was good, however half of those enrolled indicated that the textbook selection could be improved.

The majority of students indicated that the mail response time was too slow for feedback on assignments, particularly toward the end of the semester. Most students required more prompt and additional feedback. This problem was rectified when the on-site coordinator and the course instructor resorted to Fax machines to expedite feedback to students.

Two teleconference sessions were scheduled during the thirteen week course, during weeks six and nine. It was found that only nine of the thirteen students took part in the teleconferences - problems with professional commitments and weather prevented the others from participating. Of those in attendance, the majority indicated a preference for more teleconference time. They cited as the reason for their opinions the need to have more contact with both the instructor and with their fellow students.

Comments on administrative/logical aspects of the course that were elicited from students through the open response questionnaire indicate the overall positive feelings of these students about their first distance education graduate experience. The following comments serve as an exemplar:

"Telephone consultations were excellent and really helped me with the assignments."

"This is by far the most organized off-campus course I've completed. I've done several [undergraduate courses]. The multimedia approach was great. [The coordinator] was very helpful. An extra teleconference session would have been good."

"The telephone support was fantastic. It humanized the whole process."

"All correspondence with the course was very efficient. I would have liked more opportunity to discuss projects and topics with other students through teleconference."

While a few minor problems were evidenced in the administrative/logistical aspect of the course, based on the results of the data analysis, the evaluator judges that Standard 2 has been met.

Standard 3. Cognitive Achievement. Data on cognitive achievement were gleaned from pretest and posttest results and from final grade results. Pretest scores indicated that students had little knowledge of instructional development prior to enrollment in the course. Overall average score on the pretest was 29%, with the majority of students unable to attempt answers to specific knowledge-based questions. The posttest showed marked improvement, with students attaining an average score of 77%. The overall gain from pretest to posttest was 48%

The final grades as submitted to the registrar's Office were compared with the results of previous grades submitted for on-campus course sections. Analysis of results indicate that grades were comparable - in fact within five percentage points of previous course offerings. The range of grades for the pilot course was 60% to 85%, with a mean of 79%. Only one student failed to achieve a passing grade (65% for graduate courses). Records of past offerings indicate that there is one failure in approximately every four course offerings.

Based on the results of the data analysis, the evaluator judges that Standard 3 has been met.

Standard 4. Comprehensive Content Coverage. One indicator of this standard being met is the opinion of students regarding the effectiveness of course materials in relation to meeting objectives and preparing them for assignments and the examination. All students indicated that they appreciated the variety of media used. They indicated that the selection of certain media for specific purposes such as the programmed instruction text to help them in the application level of the course and the audiotapes for armchair lectures was highly effective. All students indicated approval of the amount of instructional development theory and of the mixture of theory and practice. Most indicated that the course readings were very valuable, with only one dissenting opinion on this element of the course.

Students also indicated that the amount and timeliness of interaction and feedback provided by the on-site coordinator and the instructor was adequate. In fact the majority noted the superiority of interaction over past course experiences, in particular the almost daily availability of the on-site coordinator for consultation on their assignments and course work.

No data were collected on course content coverage from the Learning Resources Program Group during the pilot experience. It is anticipated that this will occur in the next course evaluation.

Based on the results of the data analysis, the evaluator judges that Standard 4 has been met.

Standard 5. Affective Outcomes. The majority of students thoroughly enjoyed the graduate distance education course and felt that the course experience was as beneficial as if they had completed it on-campus. They appreciated both the theoretical and the practical aspects of the course, and were especially appreciative of the ability to apply things learned through the course to their own work experiences. They expressed the view that being able to access a graduate course from their homes made them feel more positive about their whole graduate programs.

With the exception of one student, all agreed that L6521 was one of the best graduate courses they had taken. They cited increased self-confidence, noting that the self-instructional course format was a new and exciting experience. They responded very positively to the course's self-pacing and self-directedness. Similarly, all but two of the students liked the programmed instruction experience provided through one of the print components of the course.

In terms of course workload, the majority ranked the workload as heavy. Nobody indicated that the course was light in comparison with other courses. Despite the heavy workload and fast pacing, students felt that the course was beneficial to them. Twelve of the students indicated that there should be other opportunities to do courses using this type of format and approach.

Based on the results of the data analysis, the evaluator judges that Standard 5 has been met.

Standard 6. Evaluation Measures. Data collected from students indicated that the evaluation measures employed in the course were effective. All students approved of the three minor assignments and the major assignment. One student felt that the final examination was adequate as an evaluation measure - the other twelve students ranked the examination as either very effective or effective. All students felt that the evaluation measures were valuable in terms of demonstrating an understanding of the course content.

Based on the results of the data analysis, the evaluator judges that Standard 6 has been met.

Summary

The audiences/stakeholders in the first graduate level distance education course indicated the concerns and issues that should be addressed in an evaluation of the pilot offering of L6521 Instructional Development. Following guidelines for the conducting of responsive evaluations as delineated by Stake (1975; 1989) and as modified by Lertpradist (1990), the evaluator developed a comprehensive set of standards for the evaluation based on audience concerns and issues. Data collected through document and record analysis,

questionnaires, and interviews indicated that all six standards had been met. While minor problems and suggestions for improvement emerged, it has been established, based on the pilot experience, that the graduate distance education is both effective and efficient in terms of meeting student and graduate program needs.

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CREATIVITY ON A BUDGET: JOINT COMMUNITY HEALTH EDUCATION

by
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This article is a follow-up report to a study that was presented at Oxford University, Oxford, England in 1991. It provides further insights into the manner by which the media continues to assist health care professionals in providing accurate information on current medical findings, practices and procedures to the general public.

A live monthly television program, About Your Health, which is a joint venture between the Medical College of Ohio and WUPW, Channel 36, the local Fox affiliate is able to eliminate many of the myths and misconceptions surrounding the doctor-patient relationship. By having authorities in such specialty areas as internal medicine, psychiatry, and oncology as guests on the program, viewers are able to anonymously call in questions which they might not feel comfortable doing under any other circumstances. Jim Krone, Director of the Office of Communication at the Medical College of Ohio and the producer of the program has assured this author that the single reason for the program's success is the anonymity that is assured to the telephone callers by the host of the program. Callers who would be embarrassed to ask a physician a question on an interpersonal level, which they consider to be of a delicate nature are not in the least bit inhibited when seeking information previously labeled as sensitive because they have been guaranteed that no one shall know of their identity.

The program first appeared on cable in Toledo in 1986. Because of its growing popularity it was decided in 1991 that commercial television would be a better alternative in gaining even higher visibility for About Your Health. The gamble that the producer took has paid off handsomely for both the college and the audience as well. In examining this risk the paper attempts to answer six questions which are ordinarily seen as roadblocks in the production process, but did not play a negative role in this instance.

1. WHAT INDICATION WAS GIVEN THAT THIS PROGRAM SHOULD BE CONTINUED AND THAT IT SHOULD BE GIVEN HIGHER VISIBILITY THAN IT HAD PREVIOUSLY RECEIVED?

The producer surmised that since each of the national commercial networks were continuing with medical segments on their schedule that he had nothing to lose and all to gain by increasing the audience viewership by switching to a more popular outlet in the community. Although the program is not in competition with CBS, Morning News the Today Show or Good Morning America it has increased the number of viewers who watch. Although the conclusion is not based upon scientific data per se there has been an increase in the number of calls taken by operators during the program and written inquiries to the station and the medical college as well

for more information. Doctors who have recently appeared on the program report that they are also receiving more inquiries.

From its inception and as it continues the focus and the purpose of the show was to present factual information that could be understood and then acted upon appropriately by the viewer. As a bonus the professional gained a higher degree of credibility because of the favorable exposure she or he received from the media. About Your Health is looked upon as one vehicle that has demonstrated that it can help in a campaign to clear up misunderstandings between the doctor-patient relationship.

2. IN WHAT WAYS IS THE PROGRAM PROMOTED?

Currently the producer of the program runs three ads in The Blade which is the daily and Sunday newspaper. The first ad runs in TV Week, the Sunday supplement, prior to the Tuesday on which it will air. The same ad will run again in "The Living Section" of The Blade on Monday, the day just before the broadcast, and finally the same ad will appear on Tuesday the day of the broadcast. It should be noted that the program About Your Health is aired live on the first Tuesday of every month. In addition to what was just mentioned Channel 36 will run between 10 and 20 "teasers" for the program. The spots are 30 seconds long and include the necessary information for the interested viewer who wants to watch it.

A publication, On The Record, of The Medical College of Ohio which has a circulation of 3,500 also advertises the monthly program. Mr. Krone is also thinking of including posters advertising the monthly program in the waiting room of a variety of medical doctors. This, of course, would depend upon budgetary allocations, but it is a good idea worthy of consideration on the part of the administration.

3. WHAT ARE SOME OF THE TECHNICAL AND LOGISTICAL PROBLEMS THAT THE PRODUCER ENCOUNTERS?

The producer mentioned that cooperation between the Medical College and Channel 36 seems to keep behind the scene problems to a minimum. Channel 36 has as its responsibility all of the technical problems and the producer handles all of the logistics. A fair evaluation on the part of this author would be that there is a clear demarcation between above and below the line responsibility. Perhaps the most important point to remember is that the success of this type of program, or for that matter the production process itself, is dependent upon advance planning.

4. HOW IS THE PROGRAM CONTENT DETERMINED?

The producer, Jim Krone, and Richard Ruppert M.D., President of The Medical College of Ohio and the host of the program determine in advance the content of each program. Some of their programs, because of their popularity, may suggest a follow-up. Coincidentally both the nationally televised program Twenty-Twenty

and About Your Health aired programs this past season on prostate cancer. The overwhelming response during and after the program indicates that there is a definite need for About Your Health to do a second program on the same subject matter.

5. WHAT ARE THE PRODUCTION COSTS?

Because of the so-called sensitive nature of this area neither the producer nor the liaison person at Channel 36 would divulge exact figures. Upon further investigation this writer has learned that the 30 second promos mentioned earlier are an in-kind donation by the station to the Medical College. Essentially this could best be described as a trade-off between the two organizations. Channel 36 did say that they only charge the Medical College for studio time. This cost would cover set-up, and actual production. Since Channel 36 is a non-union shop, the cost for the crew of eight people needed to do each show would be minimal. In checking at other commercial stations in the Toledo market the author has learned that the normal charges for the studio and air time would total $2,400 for each program.

The three ads placed in the local newspaper cost the Medical College an additional $1,200 bringing the total for each show to be estimated at $3,600. One might conclude this is a small price to pay when making a positive image in the community.

6. HOW SATISFIED IS THE MEDICAL COLLEGE WITH THE PROGRAM?

Although the institution believes that it would be impossible to collect quantitative data on the effectiveness of the program, Jim Krone, the producer of the program and director of the Office of Telecommunications is confident that About Your Health has fulfilled its objective serving as a link between the medical profession and the community in bridging the gap which existed prior to the inception of the program. One residual which he believes is beginning to happen is that the clinical faculty who appear on the program are receiving more patient referrals as a direct result of About Your Health.

It seems safe to conclude that the success of the program has been determined by the viewers who acted upon the factual material presented on the program instead of merely speculating about certain symptoms related to some imagined fatal disease. If it has achieved this goal then it can be described as a success.

HISTORICAL REALITIES AND CONTINUING MANDATES: TECHNOLOGY AND THE PARADIGM FOR SCHOOL REDESIGN.

By James J. La Follette
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> The successful transformation of student learning in the Nineties will require the bringing together of three agendas of reform: an emerging consensus about learning and teaching, a movement toward well-integrated uses of technology, and the push for restructuring. Each agenda alone presents possibilities for a very powerful redesign of education. Yet none has realized— or is likely to realize— its full potential in the absence of the other two (Sheingold 1991, p. 17).
>
> ...considerable synergy should result from the thoughtful bringing together of these three agendas. Each both requires and advances the other two (Sheingold 1991, p. 22).

The Failure of Technology to Impact and the Promise of Realization.

More than two decades ago, Richard Hooper (1969), a visiting scholar on leave of absence from the BBC, observed that the newer technologies were failing to penetrate the North American educational system. In his attempt at a "diagnosis of failure" several observations were made which we would very likely accept as relevant today:

- There are few incentives for teachers to change their methods.
- Technology is viewed as a threat by many people, both inside and outside of education.
- The educational system is a labor-intensive industry built around the live teacher.
- Technology is resisted in education because it builds up new power centers and weakens traditional ones.

Viewed from a systems perspective, some of the above conclusions might seem self-evident. A change to one aspect of a system will of necessity, alter other aspects. When innovative instructional technologies are introduced into schools, the power relationships between student and teacher, among school personnel, and between the school and society, are altered (Perelman, 1988).

Although recent years have been marked by unprecedented growth in the amount of technology available in schools, a major government report in the United States has concluded that "few teachers have found ways to exploit the enormous potential which interactive technologies offer" (United States Congress Office of Technology Assessment, 1988, p. 87).

Staunch proponents argue that new technologies can solve the difficult problems of formal education. There are others who remain unimpressed by claims that technologies can improve learning. In between are many educators who are cautiously optimistic that appropriate assignment of new technologies within effectively organized schools could make a big difference in academic performance, motivation and dedication to learning (United States Congress Office of Technology Assessment, 1988).

There is lack of universal agreement as to why schools have failed to take optimal advantage of technologies for instruction. The piecemeal deployment of computers and other technologies into schools without allowing them to play a major role in academic courses has not had much total effect on the educational system. When the question of what technology should be used is driven by the latest piece of hardware, rather than by pedagogical considerations, there is a complete lack of curriculum and learning consideration. "Decisions made without taking into account the full learning context are likely not to be adequate decisions" (Bork, 1991, p. 362).

Still, the future holds promise. Changing views of the learning process are helping facilitate *learner centered* activity in coordination with the introduction of information technologies. While instruction has historically been viewed as a process of *information transfer*, the contemporary teacher education thrust is toward a view of learning as an *interactional* process with both the student and the teacher seen as contributing to the learning process. Effective implementation of appropriate information delivery technologies makes possible a view of learning as a *transactional* process, with open exchange involving the information source, the knowledge, experience, and interests brought to the setting by the student. In such a setting the teacher serves as mentor, learning coach and guide (Resta, 1990; Hoebel and Mussio, 1990).

Receptive Learners to Active Learners

> If our society is to endure, it must be successful for each child, each person...it is vital that we work together to make the educational system succeed with *all* children not just some of our children (McCombs, King and Wagner, c.1993, p. 1).

Approaches that view students as active learners and that aim to help students to think, were historically seen as important for only selected groups of students, for example, the gifted and students fortunate enough to be enrolled in elitist type programs or institutions. Mass education arose

from essentially a "low literacy" tradition aimed at producing minimal levels of competence in the general population. (Resnick, 1987; Sheingold, 1991). As well, the cause of active learning has not been furthered by the behaviorist tradition of learning psychology, which has had a profound influence in causing school learners to be perceived as "passive receivers" instead of students actively constructing meaning.

On the other hand, successful efforts at *restructuring* or *transforming* educational systems have been characterized by an emphasis on success for all students. For example, schools adopting Outcome-Based Education (OBE) adopt the basic premise that all students can learn and succeed (but not on the same day in the same way). A key principle of OBE is the emphasis on high expectations for all students to succeed. "Outcomes should represent a high level of challenge for students, and all should be expected to accomplish them eventually at high performance levels and be given credit for their performance whenever it occurs" (Spady, 1992, p. 53).

Enthusiasm for higher order skills is often accompanied by a call for learner autonomy and empowerment. Autonomous learners in the classroom have been defined as individuals who make their own decisions relating to their own learning process. They decide what they will learn, how they will learn it, and when they will choose other pursuits. A perspective where students become masters of their own learning has profound implications for the way teachers interact with students and the manner in which schools are organized (Zimmerman, 1990). The need for technologies which can provide a wealth of information in a variety of sensory modes and facilitate interaction with students is significantly greater. Far from being discarded, the teacher is positioned to play an important role in the development of each student. "While the learner must be given a genuine range of real options, such choices cannot be infinite and teacher influence in the selection is inevitable" (Keislar, 1973, p. 126).

From Reforming the System to Restructuring and Transforming it.

Crisis in the educational system tends to be a constant of North American life. As new agendas for reform have emerged over the past century, a pendulum effect may be observed, with reform agendas tied to the apprehensions and hopes of the times in which they emerge. Thus, in some decades reformers have stressed consistency, rigor and the academic aims of schooling, while reformers in more liberal decades have been more concerned with the broader goals of society and schooling. Despite the many reform efforts, "it is notable that reformers' targets are rarely met in practice" (Firestone, Fuhrman, and Kirst, 1989, p. 7). Reform initiatives have most frequently been characterized as being piecemeal in nature, and as having no clear consensus of direction. In particular, government mandated reform strategies, relying on regulations and mandates have tended to overwhelm schools in a regulatory morass, instead of improving them (Timar, 1990).

The current educational predicament can be attributed to such approaches to reform as: a piecemeal and incremental approach; failure to utilize problem solution ideas; a discipline-by-discipline study of education; and a reductionist orientation (Banathy, 1991). However, a far more significant source is identified as being at the very heart of the problem: "It is a lack of realization of the ever-widening developmental gap between the current state of education and the rapidly changing society— and, consequently, a lack of realization that the current design of schooling is still grounded in the industrial societal model of a bygone era" (1991, pp. 5-6). As the society undergoes profound structural change, the relationship between school and community is inevitably altered, even if the school resists changing its own structure. "Changes are occurring in the real world, and the educational system must respond or become obsolete and irrelevant" (Perelman, 1988, p. 21). A response to the concerns of Banathy and Perelman is boldly reflected in current efforts to redesign schooling.

Several movements for the redesign of schooling organization have gained momentum in North America in recent years. Avoidance of the "piecemeal" approaches of the past is a dominant characteristic of contemporary movements. Norris and Reiguluth (1991) reported three characteristics unique to restructuring— systemic, thematic, and stakeholder-based— which distinguish restructuring from past reform movements. Systemic change involves all parts of a system. For any fundamental change to be successful, other parts of the system must change to fit well with it and support it. The schools reporting the most extensive fundamental changes have based their structural changes on underlying, integrating themes. In most of the schools, the people involved in planning their school's changes chose their themes based on the needs and values of their community: students, staff, parents, teachers, and other community members.

In summary, we would agree with Perelman (1988) that pushing technological innovation in schools as an end in itself is unlikely to make education more productive and could very well lead to higher costs and inefficiency. An effective strategy for transforming education "must address schools as total systems and include organization, management, and human resources in the agenda for innovation" (pp. 23-24).

The Continuing Evolution of Instructional and Educational Technology

As schools seek to engage in systemic restructuring, can instructional and educational technology play a significant role? Is there a difference between educational technology and curriculum development? Specialists within the field of education tend to fall into two roughly delineated areas: "curriculum development" and "instructional development", with the latter often associated with educational or instructional technology (Seidman, 1986). Persons who work in either field often have the same definition to which they apply different terms, or they use the same terms which may or

may not be defined in the same way. An interesting viewpoint is that educational technology is one (very applicable) approach to the work of curriculum development (Rowntree, 1982).

It may not be stretching the truth too much to conclude that at least some of the past failure of technologies to have a major impact on schooling could have been overcome if a *process* view had been more prominent. A failure to distinguish between "technology in instruction or education" and "instructional or educational technology" has often led to confusion in the field of education. When a *process* view is identified, the tendency has been to consider the process as only designing media, or perhaps instructional design and development. A definition developed by the Association for Educational Communications and Technology (1979) suggested a process for solving problems related to human learning. The AECT identified instructional technology as a subset of educational technology, and provided a relatively specific view of the solutions to problems in instructional technology as instructional system components. While educational technology is often written about in similar contexts, operational views of educational technology are only now coming into fruition.

Two conflicting views of education have dominated the scene for decades, if not centuries. The didactic (information transfer) view, which prevails among the general public, and the constructivist view. The didactic view holds that a teacher's job is to transmit their expertise to students through lectures and recitations. The constructivist view holds that teachers should be facilitators who help students construct their own understandings and capabilities in carrying out challenging tasks (Collins, 1991). Thus, the constructivist view incorporates an interactional process and moves to a transactional process with students, information sources, and teachers all interacting.

The process of instructional technology and a major subset, instructional systems design (ISD), has been associated with the didactic, information-processing, behavioristic viewpoint. As such it has been, and continues to be a useful approach for designing instructional systems. But, there is evidence that the construct is now expanding. Claiming that instructional technology had accommodated cognitive psychology in its theory, but very little in its practice, Jonassen (1990) urged the field to move toward a constructivist view of instructional design. Reigeluth (1991a) noted that constructivism offers much of value to educators, and that some of the major tenets of constructivism have long been espoused by instructional technology. For example instructional designers "have for some time advocated 'situating' learning experiences in authentic activities" (1991, p. 34). The need to couch instruction in a context that is meaningful to learners has been identified as perhaps the most significant aspect of constructivistic design (Jonassen, 1991).

Viewed in the context of Banathy's (1991) call for a truly systemic approach to systems design in education, and juxtaposed against current restructuring and transforming practices, a process view of educational technology seems to be emerging. Reminding us that our current educational system was created for an industrial society, Reigeluth (1991b) cautions that it is necessary to go beyond designing instruction, to redesigning the larger system (the organization) within which it occurs. Thus a need to think in terms of educational systems design (ESD), and not just ISD. As summarized by Reigeluth (1991b), ESD:

> ...entails identifying linkages between societal needs and/or conditions and educational system features. The product of ISD would be an instructional program, complete with learning resources for the students, and guides for the teachers/facilitators. The product of ESD would be a new school system, complete with the products of ISD, plus an administrative system which supports (is compatible with) the nature of the instructional system, and a governance system which supports that administrative system. (Reigeluth, 1991b, p. 34)

Whether we consider them to be the product of educational systems design or curriculum design, many exciting developments leading to redesigned school organizations are occurring, as school practitioners and policymakers respond to the need for a fundamental change in the schooling paradigm. As we examine some general trends of these restructuring/transformative efforts, it will be interesting to speculate on the presence of synergy, resulting from the coming together of three traditionally exclusive mandates: technology, active learners, and restructuring. It will also be tempting to question how much influence is being contributed by an expanded paradigm, not only for schooling generally, but for instructional and educational technology as well.

General Trends in Systemic School Restructuring and Transformative Experiences.

The following summary of significant common features of schools engaged in restructuring (systemic redesign of an educational system) is based primarily on: McCombs, King, & Wagner (c. 1993); Reigeluth, Norris, and Ryan (1991); and Norris and Reigeluth (1991).

- **Teacher Collaboration**: An emphasis on site-based management frequently results in an increased decision-making role for teachers. Various approaches to team teaching involve collaborative decision-making regarding management decisions. Many schools are emphasizing teacher collaboration through the creation of interdisciplinary teaching teams within a school. A common trend is to establish teacher teams that stay with multi-aged groups of students for more than one year. A long-awaited change in the role of the teacher, from dispenser of knowledge to teacher as advisor or counselor is taking place.

• **Heterogeneous Grouping:** Non-ability grouping and multi-age grouping are common features. Tracking and grouping by grade level are not commonly observed.

• **Continuous progress and ungraded curriculum:** Consistent with the concept of a learner centered program in which the active learners progress at their own pace and are involved in program design, as well as in the learning process. This feature has been implemented by such structures as: no grade levels in an entire school; continuous progress within two or three grade levels; and continuous progress within one grade or classroom.

• **Integrated Curriculum:** A common approach is to work toward an interdisciplinary or thematic curriculum, with an emphasis on providing an integrated, holistic world view. Curriculum integration is facilitated by interdisciplinary team teaching. The incorporation of community service into the curriculum is also frequently reported.

• **School as Center of Inquiry:** Involves the concept of a community of learners who are all involved in the lifelong learning and development of each citizen; an emphasis on thinking and helping students learn to use their minds well; and with an emphasis on the professional growth of teachers, developing a culture of learning and professionalism.

• **Personal (Student) Development:** A focus on the growth and development of the whole person, including academic and nonacademic areas and an integration of services to learners and their families. Students are encouraged to exercise personal choice and responsibility. In contrast to the student passively observing or listening to instruction, as active learners they set their own goals (with the help of parents, teachers, or other students) and are helped to develop strategies for meeting these goals. Helping the student discover learning experiences which are meaningful and which have personal relevance is a major goal.

• **Mastery Learning:** The mastery theme is often combined with other emphases, rather than being a stand-alone emphasis, perhaps because the concept of mastery learning may seem to contradict several of the other themes of systemic school restructuring, . Mastery is most common in schools which adopt integrated learning systems (ILS) as a transformative strategy. Performance-based assessment is an integral component of ILS. While there is fear in some quarters that ILSs could take over all teaching, it is important to consider what type of learning various technologies can deliver best. In curriculum terms, we should consider not just what is worth learning, but who or what teaches it best (White, 1992).

Product-based assessment in restructuring often takes the form of student portfolios, a strategy which seems to blend well with performance-based ILS. From a public relations standpoint, schools which can demonstrate student achievement through the rigor of a performance-based mastery system and still demonstrate student growth in such areas as thinking skills should receive strong support from parents and the general public.

• **Close School-Community Ties:** It is critical to develop support in the larger community. "School reform and improvement are old issues, and the challenge is to let the public know that systemic restructuring is not just more of the same" (Reigeluth, Norris, and Ryan, 1991, p. 14). The concept of shared responsibility means developing parental involvement, community-based participation, and business involvement. Collaborative decision-making involving all of the above stakeholders is essential. Existing programs involve meeting the social needs of the entire family by the integration of community health services into the school, and other support initiatives such as: home visits; parent classes; transportation; and various referral services. Business and other community interests frequently provide mentors who interact with students, and also apprenticeships for students.

• **High-Tech, High-Teach, High-Touch:** An example of a restructuring experience focusing on systemic and theme-based elements is the Saturn School of Tomorrow in St. Paul, Minnesota. The design is based on two principal themes: High-Tech, High-Teach, and High-Touch; and mastery learning. Saturn School (serving grades 4-7) reports that students spend one-third of their time with technology (High-Tech), one-third of their time with teachers (High-Teach), and one-third of their time working with other students on cooperative learning projects (High-Touch).

The High-Tech component includes a computer-based integrated learning system (ILS), as well as video-based instruction, especially in such core areas as reading, writing, and math. The High-Teach component involves not only the regular teachers, but considers that students, parents, educators, and the community are vital instructional resources. High-Teach includes on-site learning in the community, parental involvement, and differentiated staffing. The High-Touch component features an emphasis on letting students follow their own interests, both in choosing individual and cooperative activities and in taking heterogeneously-grouped eight-week courses.

Mastery learning is facilitated by having students and parents develop Personal Growth Plans and through the ILS. Mastery is assessed through a portfolio, teacher comments, Personal Growth Plan documents, and CAI records (Norris and Reigeluth, 1991).

Summary.

Historically, the three mandates: technological impact; active learning, and redesign of schools have each operated independently, with little integration of concepts and common purpose. Successful initiatives which emphasize all three systemically promise to produce a synergy which can result in realizing the full potential of each mandate, as each contributes its most valuable attributes to the total system.

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THE CHANGING ROLE OF THE MEDIA CENTRE IN THE 90'S

by
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Introduction

This session on the Changing Role of the Media Centre in the 90's is a follow-up to last year's panel presentation at AMTEC in Vancouver. Participants' responses and the increasingly complex technological happenings in Media Centres prompted Ross Mutton and Hélène Lavallée to revisit some of the topics covered last year while focusing on four major points.

We would like to divide our presentation to allow time for feed-back and questions as follows, devoting approximately ten minutes to each topic:

1. Consultation Role of Media Centres
2. Desktop/Multi-Media Productions
3. Intersecting Services or the Need for Bridging Between Services
4. Delivery Systems
5. Recommendations - Conclusion

1. CONSULTATION ROLE OF THE MEDIA CENTRES

New technologies are at the heart of the changing role Media Centres are facing.

- On the one hand, simple to use, user friendly equipment at cheaper costs to users allows teachers to make efficient use of various media with minimum training.
- On the other hand, the complexity of other media is enlarging the realm of creativity but costs and technical knowledge required will limit these technologies to specialists.

These two factors are the basis for the change in the type of demands made on our services related to the use of technology for instructional purposes.

External factors such as cultural changes, economical factors, competing for excellence as well as internal factors such as student expectations and the aging of faculty are all contributing to our changing role.

I would suggest that Media Centres are already providing a support role through ongoing consultation, training, advice to students and professors and by becoming more closely involved in the development of teaching materials.

2. DESKTOP/MULTI-MEDIA PRODUCTIONS

The phrase desktop video has been in use for several years, generally to describe economical videotape editing systems aimed at business and educational users. With the advent of computer packages such as QuickTime and Video for Windows, desktop video takes on a new perspective. If video compression technology continues to evolve technically and becomes operationally more uncomplicated, what will be the role of the Media Centre?

Does such technology empower the end user to produce their own support material for instructional use, in the same way they now can produce their own overhead transparencies or computer generated slides?

- Will Media Centres need to focus on training users to design their packages effectively rather than do the work for them?

- On the other hand, will Media Centres continue to be areas of expertise assisting in the production of meaningful materials with more efficient production resulting from new techniques available, working together with the content expert in a true team effort?

3. INTERSECTING SERVICES OR THE NEED FOR BRIDGING BETWEEN SERVICES

The need for bridging between services requires Media Centres to take the lead and bring together the major partners involved in providing support to professors and students.

A year ago in our presentation we discussed how various areas within an institution are starting to run into each other when trying to provide academic support service. I would like to present experiences at Carleton University over the past 12 months in this regard.

First of all, the following areas have identified intersecting services issues:

- Computing and Communications Services
- Instructional Television (ITV)
- Instructional Media Services (Media Centre)
- Library
- Teaching and Learning Resource Centre

The following issues were identified as crossing into the jurisdiction of more than one of the above operations:

- Who should be responsible for the media library, including access, cataloguing and funding?

- Who should be responsible for providing computers in the classroom dealing with software and hardware issues?

- As we enter into the use of interactive technologies, how do we share developmental responsibilities between Instructional Media Services, Computing and Communications Services, and the Teaching and Learning Resource Centre?

- How do the School of Continuing Education, the Library and Instructional Media Services share issues of operating and supporting ITV?

- Who should be responsible for maintaining CD-ROM information available to the campus network?

At Carleton University the Vice President Academic formed an Academic Services Committee composed of Computing and Communications Services, Instructional Media Services, the Library, Instructional Television (ITV), the Teaching and Learning Resource Centre and the Scheduling Office. Out of that committee, a sub-committee was formed to examine and resolve the above issues.

The official structure in place at the University of Ottawa consists in a Media Services Sub-Committee reporting to the Senate Committee on Teaching. This Sub-Committee includes faculty members as well as representatives from media services (Media Centre, Media Library, Computing Services and Continuing Education). The Media Services Sub-Committee is chaired by the Director of the Centre for University Teaching and the Director of the Audio-Visual Services.

The Centre for University Teaching has the responsibility to disseminate information on instructional technology and to coordinate all programmes of instruction in the use of audio-visual and other instructional equipment for university teaching personnel (Mandate CUT 5/93).

With the rapid technology changes occurring it was felt that another structure was needed and an informal group was formed in January 1992 composed of representatives from the Media Library, Media Production, Audio-Visual Distribution, Computing and Communications and chaired by the Director of the Audio-Visual and Reprography Service. This group holds regular meetings, to exchange information on their respective plans and activities.

In Quebec, an excellent report was prepared by a similar task force of the Université de Montréal. These links are essential if institutions are going to be successful in providing modern technology to the classroom and they are the only means to maximize our limited resources, no one can afford white elephants or building empires any more; support services must work together in choosing media, designing delivery systems and providing consultation and guidance to users.

4. DELIVERY SYSTEMS

We are providing a few articles and examples of delivery systems on this subject realizing the wide range of systems being implemented in all our institutions. These are for reference and to generate comments from participants. We would welcome your feed-back and personal experience in trying to address this issue in your institution.

We see the major issues to be:

- Financial resources (lack of)
- Need for standards
- Varying classroom needs (and size)
- Choice of media (permanent versus delivered)
- Lighting and sound
- Future technologies

Two of the systems observed are the Integrated Information System (IIS) developed by Dynacom and in place at Ball State and Notre Dame Universities, Indiana; the other system Crestron is currently being used by Skill Dynamics, a teaching and learning centre in Toronto.

There again the need for concentrated efforts between services is essential. The use of fibre optics to link classrooms involves Computing and Communications, the identification of present and future needs must be provided by Media Centres and Media Libraries and the need to involve Physical Resources if these changes are going to occur successfully.

5. RECOMMENDATIONS - CONCLUSIONS

Originally the Media Centre was easily identified by its equipment and the kinds of materials to be found within its walls. In the future, there may be no "materials" within its walls and its equipment may look very much like that in the computer centre. What will be the future of the Media Centre?

As with last year's session, we will be looking for comments and suggestions from the group, particularly in regard to the role that AMTEC can play in the issues discussed.

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Motivating Students: Lessons from Theory

by Richard F. Lewis

Should you read this paper?

Answer each question true or false.

1. Today's students need to be "turned-on" to learning more than when I was in school.
2. The media, especially television, can be more effective motivators and communicators than schools and training agencies.
3. I teach many different types of students.
4. I don't know enough about how attitudes can be changed.
5. I don't know enough about why people do something.
6. I would like to have students want to come to my classes.
7. I don't know enough about why some information is believed and why some is not.
8. I cannot identify different patterns of reasoning.

Scoring: Count one point for each "true".

6-8 You should definitely read this paper.

3-5 You should probably read this paper.

0-2 Spend your time doing something else.

The teaching/ learning environment of the future will require us to help students want to learn, not just to teach those who already wish to.

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Teachers should motivate more and teach less!

Teaching should be structured to help students achieve the goals of the educational system and their personal goals efficiently and effectively. Because time is valuable, each teaching interaction should achieve as much as possible in the available time.

In the world of mass media, someone has always had to pay for design, production, air time or printing and distribution costs. As a result, media people must ensure that their messages get communicated effectively. Because media messages have to compete with each other and with non-mediated messages, like school and the family, they have developed powerful means to motivate the audience to tune in. Advertisers and programmers apply powerful principles from motivation theory and attitude change theory to persuade us. This persuasion barrage has a direct impact on students. Postman and others speak of television as the first curriculum, telling students what to think, how to feel and what to buy.

Learn how to communicate like the Mass Media, they have been well-taught

As teachers, our goals may differ markedly from those of other persuasive sources. In the educational system, we try to teach thinking and decision-making, evaluation of "facts" and other cognitive skills. We try to present multiple views of an issue and teach problem-solving.

By adapting techniques used by the mass media and by re-applying principles of rhetoric, we can begin to compete with mass media messages on their own turf. We can design messages which will attract and hold students' attention. We can change attitudes as powerfully as the makers of deodorants, who convinced us that we needed to spray or spread every day. We can teach decision-making and problem solving skills with the same power as aerobic videotapes and how-to-do-it programs.

The key change will convert teachers from information communicators to motivators. Because we cannot predict the amount or type of information our students will need, we should begin to concentrate on motivating students, inspiring them to lifelong learning. Instead of ensuring that "the book is covered" we will motivate students to explore a topic further.

Planning for Student Motivation

Identify the **Content.**
Identify the **Student Motivation**
Use **Attitude Change** principles.
Structure Content effectively
Design your Instruction

Motivation Principles

Motivation appears to be the key to wanting to learn. I often hear students and colleagues talking about getting motivated. Often the spark which motivated them came from someone else. I would like to see our students become motivated to learn.

The first step in motivation appears to be to examine why someone might want to learn. Let us assume for the moment that "the love of learning for learning's sake" fails to motivate most people. Below, I have listed some reasons why students might want to learn. All reasons will not be applicable. We need to analyze our students to determine which ideas apply to them. We also think of other reasons why anyone would want to learn what we want to teach. Remember that if there is no reason to learn (other than a mark), students may not perceive the content as important. We need to focus more on the reasons for learning and less on the actual knowledge.

Achieving Personal Wellness

The need to be fulfilled and happy seems obvious but we seem to ignore it as a motivating device. We need arithmetic skills every day, yet many of us fear the thought of multiplying several numbers or calculating the US exchange rate. We need to be able to write and speak clearly. As I look back on my education, so much of what I learned in classics, English and history classes dealt with thinking and writing. The problem was that I did not recognize the end goal: thinking clearly and speaking knowledgeably.

Getting a job, or getting promoted

Most people realize that they need skills to get a job. The trick here is to link the content to a job skill. Teachers will also need to present evidence that the skill is needed. Many of us may need to find out how content relates to employment.

The Need to Belong and Love

Maslow (1954) and others suggest that everyone needs love and security. One motivation to learn might be inclusion in an exclusive group. A high-school student recently worked very hard to audition for the Windsor Symphony simply, I think, for the joy of belonging to a prestigious organization. Working with like-minded professionals motivated this 16-year-old student in a manner unmatched by years of lessons and music teachers. His self-esteem and musical ability grew exponentially as a result of his experience with the Symphony.

Self-Actualization

Self-actualization is Maslow's highest level need. Some people appear to want to learn simply because they want to be the best that they can be. External factors really do not matter. Students who seek self-actualization may not need to be motivated by teachers. However, appealing to the need for self-actualization may allow us to present some content more effectively.

Impress people

Most people like to demonstrate what they know. In the Stanley Cup games, the players love the cheers of the fans when they perform well. Home-ice advantage appears to support this need. Players respond to the cheers of the crowd and try harder. In class, there are opportunities which allow students to perform. Letting a student teach a class, lead a group or act as a facilitator may provide added motivation. Mature students in my classes have often helped me to communicate concepts, empowering themselves in the process.

Curiosity

We appear to be naturally curious. We investigate new sounds, patterns and phenomena but different people are attracted by different stimuli. In learning situations, curiosity appears to be in short supply. We need to help students become curious. We need to find out what makes them curious and then relate our teaching to it. In my second-year persuasion class, I discovered that television commercials can serve as excellent tools to spark curiosity.

The Need for a Challenge

Some people like to face a situation in which the odds are stacked against them. The need for a challenge is one which motivates some people and leaves others filled with doubt. Identifying the person who needs a challenge is critical. One senior high school student overcame immense odds to re-design and produce a high school newspaper. Many said it could not be done. This young student saw the challenge and decided to meet it. In the process, she has learned a great deal about news, organizing people and school politics.

Being the Best

We also appear to be naturally competitive. We want to be the best of our group even if it is not our personal best. We need to find something in which

each of our students excels and then allow them to exploit their talent while enhancing it.

Using Motivation Principles

The key to using motivation principles is to re-examine each content topic we are teaching to determine why students would want to learn it. We may have to forget the old maxims like "Because you may need it someday" and "Just trust me". We need to focus on the benefit the student will get from learning the content or learning a process. If we cannot find a reason for teaching the content except that "it's in the curriculum" or "that's the way I was taught so that's how you will learn", we should not be surprised at low motivation from students and teachers.

A colleague who teaches a course related to history, complains that the content is just not interesting to his students. In response to a question, he agreed that the content does not interest him very much. Can we anticipate motivation problems in this class?

How I Tamed Theory 272: A Practical Example of Motivation in Action

Several years ago, I started teaching a new course, called the Theory of Message Design. Students in our production stream had to take the course. Theory courses, especially required ones are not desirable activities. My challenge was to make the theory of message design interesting. I used three motivation principles: personal fulfillment, employment and curiosity.

In the personal fulfillment area, I try to indicate that we are persuaded almost every minute. To remain focussed and motivated, we must withstand some persuasion attempts and deny others. Identification of persuasive strategies and goals can make us more resistant to the persuasion.

Most jobs require someone to persuade someone else about something. The persuasion may occur in conversations, presentations to groups or by preparing mediated messages. I try to relate every teaching activity to job skills, demonstrating where possible with video clips from television programs and ads.

My students listen to a lot of music and watch a lot of television. Anytime, I air a video clip or music, I have their attention. I also believe they are curious about how I will relate a theoretical point to the example. After three classes, they bring in music, comic strips, print ads and videos, illustrating points in the text. Another way I work on curiosity is to read several provocative sentences from the next chapter of the book. I hope that the preview may encourage some of them read the material before class.

Attitudes can be Changed Using Different Techniques

Attitudes are positive or negative feelings we have about a topic (Petty and Cacioppo, 1981). We develop them from our experience. Most theorists believe that attitudes affect behavior. Coaches in every sport often blame a lack of success on players' attitude, citing the point that the talent is there but the desire is not. Attitudes appear to be the catalysts which release our knowledge and ability and allows us to perform effectively.

Some suggest that we do not need to worry about attitude in instruction. For some, it is sufficient to teach and test the skill or knowledge and ignore the attitude. Let me argue the reverse. I fail to understand why most of the population spends 12 to 14 years taking math and still has significant phobias about the subject. As a teacher, I would rather have a student know less and want to know more than to pass the course but hate the subject.

Skinner says: Reward and Punish.

Skinner's followers suggest that people change their attitudes to gain rewards and avoid punishment (Hildum and Brown, 1956). Use reward or punishment to help the person express the attitude. Identify rewards and punishments and then use them to elicit the appropriate attitude. In school, grades sometimes work. In the workplace, money can serve the purpose. Thanks can also work.

Although reinforcement theory is widely used, the effects may not last. When the reinforcement or punishment cease, the attitude or behavior may revert to the undesirable. On the 401 between Windsor and Toronto, drivers seem to go as fast as they can until the police appear. Once they disappear, the drivers resume speeding.

Student persuade yourself.

Role-playing in a situation can help change attitudes(Janis and King, 1954). In role-playing, students are asked to espouse the desired attitude. In espousing it, they may change their minds. A grade 12 math student was recently asked to teach a class of grade 8 students. He remarked that it was very hard to find out if they understood his concepts. He expressed a new view of teaching, one which may help his own participation in his own classes.

Introduce Conflicting Ideas

To alter a person's balance, introduce ideas which are incompatible with those already held. Festinger (1957) suggests that some change will have to occur because the person seeks harmony. Most young people believe they will live forever. Many also practise unprotected sex. Suggesting that the unprotected sex might lead to AIDS may help them re-examine their beliefs and perhaps change their attitudes. Since dissonance is caused by the existence of conflicting ideas, the person must change something to reduce the dissonance and restore a state of equilibrium.

Just the Facts Please!

Attitudes are supported by beliefs (information about a topic) . If we can present new factual information which alters beliefs, attitudes may change Fishbein and Azjen, 1975). Changing beliefs can lead to lasting attitude change. This approach is more powerful than reinforcement approaches (Petty and Cacioppo, 1981).

I Want to be Like Everyone Else

Other theorists suggests that people will change their attitude (sometimes only temporarily) if they think others around them approve or disapprove (Newtson and Czerlinsky, 1974). To use social comparison theory, question students in the presence of people who approve of the desired attitude change. A recent Ontario government ad campaign on sexual harassment, has friends disapproving of other friends social conduct. Losing the approval of a friend may help the offending party think twice about a repeat offence.

Structuring Content

We need to believe that certain things are true. We base truth on evidence or reasoning (Larson, 1992). Structuring content helps the student to arrive at a logical conclusion based on information gained through evidence or reasoning.

Evidence consists of the support which we need if we are to believe something. Evidence can either appeal to our emotional side or to our rational side. It can be presented in three ways: through dramatic approaches, through testimonials or through participation.

We use the **dramatic approach** very often when we converse but less often when we teach. In social situations, we often tell people stories. Gifted story-tellers like Isaac Bachevis Singer can help us to view our world through different eyes. Stories are naturally appealing. On CBC radio, Bob Johnson, a history columnist, relates a series of historical facts using a narrative. Paul Harvey's "The Rest of the Story" radio series uses the same approach. Although both formats present facts, they do so in an appealing manner.

Teachers can use a narrative approach to present content. Students can also be encouraged to use narratives themselves to relate their findings. Because stories about people are naturally appealing, other students may be more inclined to attend to such content.

Testimony also helps to communicate content. Television channels are filled with testimonial information. A recent ad for lawnmowers shows hockey star Brett Hull happy with the power of his new purchase. Gretsky only drinks certain beverages, as does Ray Charles. The accessibility of video for testimonials makes it a powerful tool in the teacher's repertoire. Recording and using testimonial statements from parents, former students and colleagues can

enhance attention. In a workshop recently, I asked participants to record a thirty-second video message describing how they would change a communication message. The resulting playback acted as testimonials for the approach I had advocated.

Participative evidence has the student actually become part of the creation of evidence. In driving a car in a Canadian winter, we can create participate evidence as we begin to drive. If the car slides and we lose control, we have direct evidence of the road condition. This evidence then forms part of our factual repertoire about the road condition and the recommended driving speed. It should affect how we drive for the rest of our trip. Jurors in a court have sometimes been asked to visit a location to simulate the conditions which might have been operative at the time of a crime.

Reasoning

In reasoning, we draw conclusions based on information (gained through evidence). In reasoning, though, we infer a conclusion. Larson (1992) describes some patterns of reasoning. Teachers can use these patterns to help students learn the desired information.

In **cause-to-effect reasoning** we decide that doing something will cause something else to happen. Taking a pill will reduce pain; watching too much TV will ... etc. A cause-to-effect reasoning argument can lead a student to believe that cause and effect are related because they have been linked.

Effect-to-cause reasoning assumes that the observed effect was caused by something else. The statement of the effect is attributed to the cause. Politicians keep trying to determine attribute effects to causes. Deficits are usually blamed on the previous government or on world market conditions.

Reasoning from symptoms collects a series of observations and then tries to conclude something from them. People often make judgements about a person's attitudes by observing their dress and behavior.

In **criteria-to application reasoning**, the persuader must establish certain criteria which will be accepted and then show how someone or some product meets the criteria.

Reasoning from comparison uses the known to explain the unknown. We can speak of poor attitudes in the workplace as a cancer spreading through the body (society).

Deductive reasoning works from the general to the specific. It tells the student what to believe by drawing a set of conclusions.

Inductive reasoning by contrast, lets the student arrive at the conclusion, based on a set of information.

Dare to Differ

Motivating students using the three sets of theoretical principles can make teaching more interesting for the teacher as well as the student. A fundamental principle involves keeping the student's needs and attitudes firmly in focus. The motivation and content structuring principles are easy to follow. The attitude change literature may be more difficult because the teacher must determine the theoretical approach most compatible with his/her own attitudes and beliefs. When attempting to change attitude, the teacher should also analyze which theoretical tradition he/she is following.

I have used the material in this paper as I prepare and teach my classes. As I continue to apply the principles, my preparation time increases but the satisfaction in watching the impact on the students makes the time worth spending. I have tried to improve my classes one at a time, working on the classes which have given me the most problems and leaving the easier ones for the future. Using this approach, I make making steady progress in motivating my students.

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A HYPERMEDIA PARADIGM FOR CONTRASTIVE PHONETICS

by

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Abstract

Hypermedia allows us to integrate a variety of presentation formats such as text, graphics, and sound. This combination of modes makes the technology an ideal vehicle for the implementation of pedagogical design in general. It has a particularly rich potential in the domain of language instruction as the explosion of CALL software in the last few years has demonstrated. The purpose of the present paper is to describe one such application: in which Hypermedia technology was used to create a stimulating and innovative educational instrument. The program was designed to facilitate the acquisition of rudimentary pronunciation and reading skills by presenting, in multi-media format, the essential phonetic codes of three different languages: English, French, and Italian. The stimulus for the realization of the project was provided by the current debate on the Whole Language versus Phonic approach to language instruction. In the Canadian educational system over the last twenty-five years, the Whole Language approach has been the predominant method employed to teach reading skills. However, the effectiveness of this method has come into question recently with the proponents of the Phonics approach calling for a return to the traditional way of teaching reading, that is by breaking down the word into its phonetic components. The present computer program is intended to facilitate the task of educators who favour a more diversified or blended methodology. It achieves this goal by providing most of the visual and aural material that a language instructor (first or second) would require in order to impart the basic concepts of phonetics. The phonetics program is designed to serve either as a vehicle for self-directed acquisition of basic pronunciation and reading skills, or as a pedagogical tool to be used by a phonetics instructor or speech therapist. There are two primary advantages in the program: at the theoretical level, it serves as an introduction to the science of acoustical speech analysis, and at the practical level, it is a useful first encounter with language study.

A HYPERMEDIA PARADIGM FOR CONTRASTIVE PHONETICS

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1. Theoretical Premise

The acquisition of a first or second language occurs on different levels simultaneously: phonological, morphological, syntactical, lexical, and semantic. In the teaching of a second language, theories abound concerning the nature of each of these components as well as the most proficient methods for stimulating, accelerating, and testing the assimilation of these same units. Computer technology has provided valuable software intended to address each of these areas of language learning. Developers of Computer Assisted Language Learning (CALL) software have given the language instructor many programs dealing with vocabulary flash cards, grammar exercises, translations, pitch simulators, and CD ROM presentations of dialogues and settings. Indeed, so pervasive are computer applications in the second language environment that computerized programs to accompany introductory and intermediate language texts have become virtually standard. It must be pointed out, however, that most, if not all of the software presently available deals with a given language from the whole-word or phrase standpoint. A few programs concern themselves with language at the phonetic or phonemic level: that is, at the basic sound unit. Part of the reason for this has been the belief that has prevailed in the last twenty or thirty years: namely, that reading and other language skills are acquired in whole-word and complete sentence contexts. Another part of the reason is the fact that pronunciation has traditionally been handled in the language lab because it is an aural activity. The scientific study of linguistic sound production, phonetics or phonology, is a special branch of linguistics, is normally taught separately from the elementary language courses, and relies heavily on phonetics manuals which contain illustrations of the vocal apparatus. The acoustical model is provided by the instructor.

The development of the Brock Contrastive Phonetics Program grew out of the conviction that a focused approach to the "elementary particles" of language, as it were, is highly desirable and useful even in the prevailing context where the communicative approach to second language teaching is quite common. This methodology stresses real-life communicative activities which, of course, deal with large segments of speech: such as phrases and sentences. Virtually mandatory is the use of the target language for the performance of these activities; in a sense, the communicative approach is an immersion format. Our phonetics program, we believe, has a role to play both within such a unilingual environment, and in a comparative

context where first language (L1) and second language (L2) are discussed or analyzed simultaneously.

In its present form, our phonetics program is based on the presupposition that the learner of a second language, in the initial stages of the acquisition process, attempts to read or decipher the new phonetic code in terms of his/her own native tongue. As linguists are aware, each language is reducible to approximately thirty sounds or phonemes (some have a few more, others a few less). However, the inventories of sounds do not always correspond. In fact, even where languages have a common origin such as French, Italian, and Spanish, several phonemes do not match exactly. In these cases where the sounds of one language are not available in another, the learner is forced to approximate by reproducing those phonemes with similar phonemes in his/her mother tongue. A case in point, are the English phonemes [th: $\widehat{O}$] (e.g., thick) and [th: Θ] (e.g., them) which are not part of the Italian and French codes. Italian and French speakers are likely to substitute [t] and [d] respectively. The phonetics program is intended to serve as an instrument which allows the user to examine closely the mechanics of the production of these sounds and, thereby, enhance the possibilities of recreating the sounds more precisely and consistently.

2. Characteristics of Language Learning and Challenges of Language Teaching

Language learning can be an exhilarating or a frustrating experience depending on the interaction the students have with their learning environment. In order to achieve a more positive experience, it is worthwhile to try to identify some of the characteristics of language learning. Language learning is: 1) a multisensory phenomenon, 2) a multifaceted and complex activity, 3) a time and memory-intensive enterprise, and 4) a deeply personal experience in which motivational and emotional factors can hinder or enhance acquisition. In an ever-changing and complex field such as language learning, instructors are continually faced with a large number of challenges. Two stand out as arguably the most important.

The first challenge is to provide ongoing and stimulating contact with the target language outside the formal instructional environment of the classroom. In order to help students to maximize their language acquisition experience, it is not enough to provide them with instruction in a classroom setting. Students should have access to a comparable level of instruction outside class hours. They need a similar multisensory and interactive experience available in a self-directed mode of learning. This need can be met by the adoption of some kind of technology which facilitates the designing of an effective language learning environment that does not require a great deal of supervision (see Marini & Federici, 1991; in press).

The second challenge is to choose the best technology available. We believe that instructors today can modernize their teaching techniques by taking advantage of the expanding field of computer technology, while resisting the temptation to be swept up in a wave of untested or ineffective innovations.

We maintain that in order to meet these challenges, instructors must design effective and motivating learning environments which can enhance the production of literacy. It is the objective of this paper to describe an approach which provides the language instructor with the linguistic and technical means to achieve this goal.

Although there are some academics who express reservations about the impact of technology on education, on balance reaction ranges from a categorical refusal to use technology in the classroom, to a blind acceptance of every innovation presented to them (see Nuessel, 1989, for an excellent presentation of the advantages and disadvantages of CALL). A critical and positive approach is required to reject frivolous trends and to explore promising developments. It is our view that instructors might do well to rely on the effective use of currently available computer technology. In fact, it has been proposed (see Marini, Mitterer & Powell, 1991), that the current computer technology can provide educators with a number of dimensions which, when properly deployed, can create effective and motivating learning environments.

From another perspective, the Hypermedia Contrastive Phonetics Program described here represents an application of modern technology that is likely to generate an enthusiastic response and a greater receptivity to the conventional ways of presenting the principles of phonetics.

As mentioned earlier, orthodox methods of teaching basic reading skills rely on the imitation of speech produced by an instructor or by taped language lab drills. Both of these techniques have strengths and weaknesses. For example, although the presence of an "active" instructor is preferable, due to the greater degree of interactivity that he/she provides, there is the problem of limited availability. On the other hand, a "passive" language lab environment solves the problem of limited availability, but offers only limited interactivity. What is needed is a learning environment which brings together the strengths of the two methods while it minimizes their shortcomings.

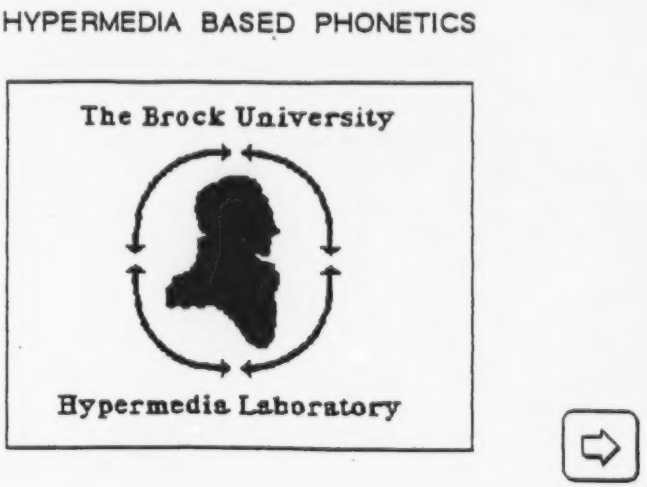
The Hypermedia Contrastive Phonetics Program outlined here permits the teacher of English, for example, the opportunity to examine the mechanics pertaining to the production of elementary sound units, as well as to note the correlation between phonic and graphic (i.e., the written word corresponding to the uttered sound) components. In addition, the program permits the teacher of a second language (French or Italian) to compare phonic units of the target languages so that the acquisition of

basic reading skills in the second language are facilitated by a process of direct visual and acoustical juxtaposition. Part of the motivation for exploring computer capability comes from an awareness that reading or pronunciation problems tend to be chronic in non-native speakers (although there are implications for dialect speakers as well). We believe that the application of computer technology can provide a reliable and very useful instrument of correction (see Marini, Mitterer & Powell, 1991; Marini, Federici & Mitterer, 1991).

3. Features of the Brock Contrastive Phonetics Program

Upon initiating the program (see **Figure 1**), the user is given three options for the language of instruction. By clicking on the appropriate icon, the user selects to have all the instructions, as well as all the phonetic explanations provided, in the language of choice (see **Figure 2**). The computer subsequently presents a screen on which four labels appear: START, INSTRUCTIONS, CREDITS, QUIT (see **Figure 3**). If the user clicks on the INSTRUCTION button, the program will, of course, present a step-by-step description of the program's navigational features (see **Figures 4 & 5** for a brief description). If the user is already familiar with these, he/she may choose to activate the START button. This action causes the program to default to the English language screen (see **Figure 6**). Across the top border, the three language labels are

Figure 1



displayed, with the English label darkened to signify that it is operative. Below these, in a horizontal strip, are the twenty-six letters of the English alphabet with the A darkened; again, this is the default selection. Any other letter of the alphabet may be selected by means of the point and click technique. Since Italian utilizes only twenty-one letters, the user is told that the letter is inactive when he/she selects J, K, W, X, or Y. Beneath the alphabet line are four windows: two large rectangles and two smaller ones. In the rectangles in the left half of the screen, are drawings of the vocal tract in the rest position: a lateral view in the upper, and a frontal view in the lower. The upper window on the right side displays the phonetic symbols for the variants or pronunciations of the letter selected. These symbols are those standardized by the International Phonetic Association. In the case of the default position, six phonemes corresponding to the English A appear. The user may select any single symbol in any order or may repeat as frequently as desired the selection. When one symbol is activated, several things occur: (1) a voice recording

Figure 2

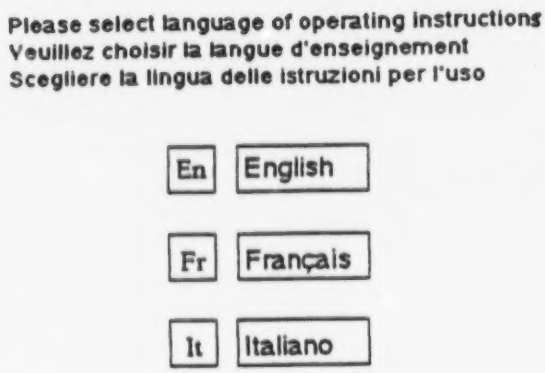
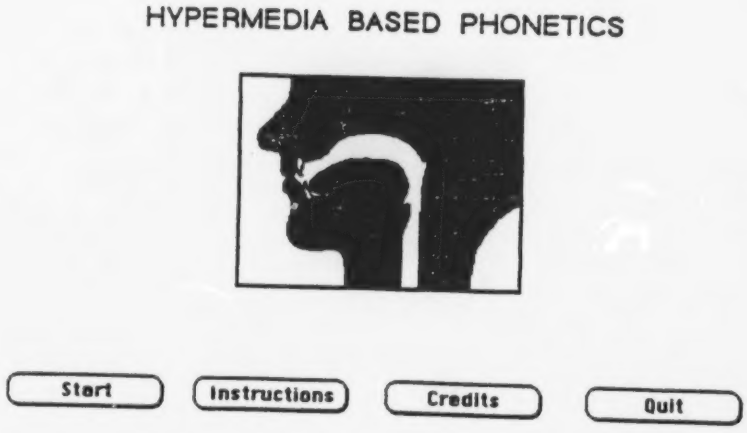


Figure 3



of that sound is heard, (2) the illustrations on the left-side windows are replaced by drawings which show the vocal tract in the position required to produce the sound heard, (3) words containing that phoneme appear in the lower right window (from one to four words). The user may click on any of these in any sequence and hear the word spoken.

On the same screen, there are several buttons or icons placed in a vertical band along the right edge of the frame. Citing each of these from top to bottom, the first locates a phoneme selected across the three language stacks. That is, the visual and aural cues associated with that phoneme are presented consecutively.

The second icon is activated only after a symbol has been selected. When it is clicked, there are changes in the contents of both right-side windows (see **Figure 7**). In the upper, a reference drawing of the vocal tract, lateral view, appears. The picture includes a numerical scale from 0 to 10 to indicate maximum and minimum aperture of the oral cavity. In the lower window, text

Figure 4

In order for you to familiarize yourself with the directional symbols (buttons) used in this program, please study the following legend:

FUNCTION OF THE BUTTONS

1. This button allows you to locate recurrences of the selected phoneme across the three languages.

2. This button calls up a written phonetic label for each phoneme, as well as a brief description of the key vocal organs in the positions required to produce such a sound.

Figure 5

3. This button activates the sequential reading of the mini-dictionary.

4. By clicking on this button you can access the comparative, split-screen mode.

5. This button allows you to see the instructions whenever you need to re-read them in the language you requested at the beginning of this program.

6. When you click on this button, the program will return you to the home stack.

appears, the length of which varies from one or two sentences to several sentences (in the language chosen at the start). The purpose of the text is to identify in phonetic terms the mechanics involved in the production of a given sound. A constant set of criteria were adopted for the preparation of these mini-texts; namely, (1) a technical term specified by phoneticians to identify the sound/phoneme, (2) a reference to the degree of aperture created by the lowering of the jaw, (3) the position of the tongue relative to the palate, teeth, and floor of the mouth, (4) the shape of the lips, and (5) any special descriptors which help to differentiate a sound in one language from a similar sound in another language.

The L1/L2 icon causes the single language screen to split into two halves which mirror each other (see **Figure 8**). Many of same features that have been described to this point apply to the dual screen mode of operation with the exception that the vertical row of icons is not included. This means that the textual phonetic information is available only in the single-screen mode. Some abbreviations had to be

Figure 6

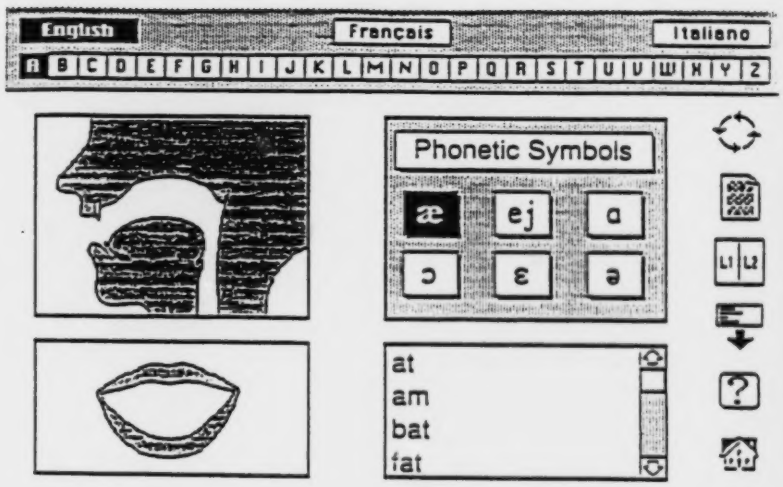
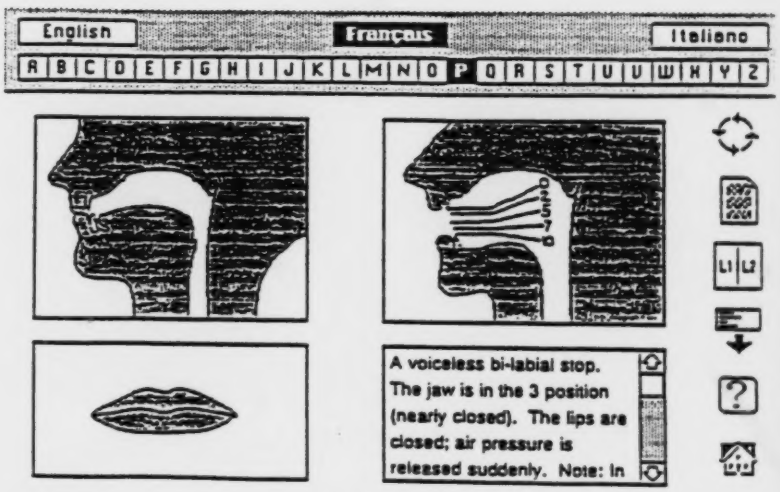
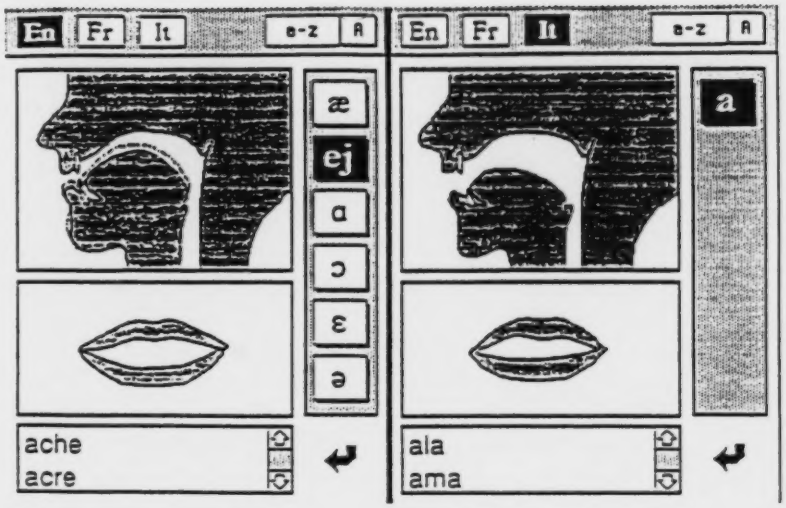


Figure 7


English
Français
Italiano
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
A voiceless bi-labial stop. The jaw is in the 3 position (nearly closed). The lips are closed; air pressure is released suddenly. Note: In

introduced in the dual language screen because of limited screen space. The user may select any letter of any of the three languages from a pop-up alphabet for the left side and repeat the procedure for the right side. As previously stated, any phonetic symbol on either side may be activated as often as desired.

Figure 8



The fourth icon permits the automatic reading of words contained in the lower right window. The question mark icon returns the user to the complete set of instructions for clarification or review of the protocols. The home icon terminates the program by returning the user to the home card.

4. Technical Aspects

The Brock phonetics stack was developed in 1991 and is the work of the authors of this paper, a computer expert, an artist, a linguist, and a technical assistant. It was developed using the Macintosh Hypercard program (version 1.5), a Mac scanner and a Macrecorder. At the time, PC software of comparable capability and sophistication was not available, and so the project was completed on a Macintosh platform, even though we realized that the finished product might have greater usefulness if it were available in PC format.

Over the past two years, the team has worked to complete the program, making refinements and correcting errors; but, more, importantly, it has imported the program to a PC platform. This was accomplished by transferring the visual and textual data so that it could be accessed using PC Plus, a Hypercard-like application. In order to reproduce the phonetic symbols, it was necessary to load an IBM version of the IPA (International Phonetics Association) font and reinsert all the symbols into the

appropriate windows. The transfer of the voice recordings proved to be a greater challenge; nevertheless, it was successfully accomplished, and now we are pleased to report that the Contrastive Phonetics Program is currently operational on both systems. This should make the program more accessible to educators since a large number of machines in language labs are IBM compatible.

In order to run the program in a Macintosh environment, one needs a Mac plus or Mac II computer with at least 15 megabytes (MB) of storage capacity and Hypercard (V 1.5). To run the program on a PC platform, the user would need a 386, or better, IBM compatible computer with a 15 MB hard drive and Plus 2.5.

4. Pedagogical Aspects and Potential Instructional Applications

The Brock Contrastive Phonetics Program permits comparison of any of the available phonemes in one language with any phoneme of the language which the user knows. In this sense, the program is "open ended." In other words, if the user's mother tongue is not one of the three languages utilized in the program, he/she can compare and contrast the sound of a particular phoneme from the stack with similar or dissimilar sounds in his/her mother tongue. As well, the user may compare the physical aspects of his/her own articulation with the stack's visual representations. To illustrate, if a Spanish speaker wishes to learn or improve his/her pronunciation of English, he/she selects any letter of the alphabet, then proceeds to click on each of the phonetic variants from the Symbols pad. The user may then attempt to reproduce each variant and match his/her utterance with that of the computer. The visual cues are designed to enhance the user's ability to recognize, recreate, or approximate discrete units of sound. Of course, if the user does not read English, French, or Italian, he/she will not be in a position to take advantage of the explanatory notes and will need assistance from a tutor or monitor. Use of the phonetics stack by such individuals in an independent-study mode has a more limited viability since the process of monitoring or correction can be performed only by the user.

If, on the other hand, the user is familiar with one of the three base languages of the stack, the procedures would be somewhat different. Let us say that an English speaker wishes to learn or improve his/her pronunciation of French. In this case, the user has two operating options. In the single language screen mode, he/she may activate the French stack and proceed through the entire set of phonemes, comparing and contrasting each with those of his/her own phonetic inventory (as the non English-speaking user would). In this instance, the individual has access to the instructions as well as the technical information presented in the lower right side window. Alternatively, the same user can switch to the dual language screen which permits him/her to see, simultaneously, the visual cues pertaining to any two phonemes--for

specifically focused study. For this type of individual, the phonetics program represents a more complete and self-contained unit. If the user is familiar with the fundamentals of phonetics, he/she will not require assistance in interpreting the images and texts. If, however, he/she is unfamiliar with these linguistic concepts, the program's entire resources are not accessed.

In the case of instructors contemplating the implementation of the stack as a visual aid in the classroom, both an immersion and a bilingual environment could be accommodated. The eventual implementation, of course, depends on the pedagogical preferences of the instructor. In an immersion context, a French instructor, for example, could conduct the class strictly in French to discuss basic problems of pronunciation, introduce elementary principles of physiological phonetics, or conduct a session on corrective phonetics. Indeed, the same instructor may choose to examine the problems associated with the selection of a standard pronunciation, dialect variables, or the peculiarities of québécois. As well, the instructor may elect to discuss the limitations and/or advantages of establishing the alphabet as the program's anchoring device. The immersion approach could also be adhered to in the analysis of the similarities and differences among the three languages represented in the stack. In a bilingual environment, the distribution of "language time" is determined by the instructor--again, in keeping with his/her methodological preferences. In either instructional model, the stack can be used to introduce and/or clarify aspects of the relationship between the graphic sign and the acoustical sign. As well, a system of monitoring student improvement or of testing acquisition of material can be set up by the instructor. For example, the student might be asked to identify the phonemes that correspond to a given grapheme; locate all the occurrences of a specific phoneme in one language (for example, a fricative); or be shown a drawing of the vocal tract and asked to produce a description of its primary physical features. The importance of phonetics as a branch of general linguistics and as an instrument for the presentation of language has always been recognized. However, since educators in Canada have recently come to question the whole-word approach to the teaching of elementary reading skills and have advocated a return to phonics, the present phonetics program, we believe, has a role to play in the context of such views.

Although the alphabet design may not be ideal for the phonetician, the different categories of phonetic sounds can be easily identified and called up for extensive exploration by the instructor. The program is designed to be flexible so that a phonetician can easily present various groups of phonemes by isolating them for the class. For example, if the instructor wanted to focus his or her class on the identification of the vowel sounds across the three languages, the program can accommodate these demands. Similarly, if the instructor wanted to isolate the various consonant categories such as fricatives and labials, again the program permits this type

of presentation. In this respect, the use of the program is only constrained by the imagination of the instructor.

As well, the present program could conceivably have clinical applications in the context of speech therapy in the form of teaching the hearing-impaired and the deaf to recognize and produce units of speech. At the same time, the program can be used by the patient in a self-directed mode, similar to what is done in a Second Language instructional setting.

In the context of literacy, the fact that so much research has gone into the phenomenon of language acquisition attests both to the complexity of the subject and to the importance of literacy. We are of the opinion that a fully developed Hypermedia Based Language Learning Environment can provide an extremely useful and versatile instrument in the struggle to help people improve their level of literacy. This is especially relevant in modern Canada where the rate of illiteracy is surprisingly high. In fact, according to Statistics Canada the national illiteracy rate is as high as 38%, which means that about 4.5 million Canadians over the age of 16 do not have necessary reading skills. In this context, it is important for the country to develop more effective ways to teach resident Canadians and new immigrants language skills to a level where they can be more fully participatory citizens. It is our contention that the Contrastive Phonetics Program developed at Brock University makes a modest contribution to the attainment of this objective.

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Authors' Notes

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A CONCEPTUAL FRAMEWORK FOR NEW PARADIGM RESEARCH IN HUMAN SCIENCES: PHENOMENOLOGY

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INTRODUCTION

The qualitative method of research offers a way of doing research in the human sciences which is an alternative to the way in which it has traditionally been done. Qualitative research is in its infancy but is experiencing a rapidly growing interest which can be evidenced by the increasing amount of literature and conference proceedings. Most of the research practiced in the human science field makes use of experimentation involving the use of a quantitative method borrowed from natural science. The approach and method a researcher uses is always dependent on the question being asked before the scientific enterprise is started. When the answer is to be of a descriptive kind it is not necessary to employ a quantitative question. "Science emerges from the other progressive activities of man to the extent that new concepts arise from experiments and observations." (Conant, 1947, p.24).

The qualitative research question is formulated to reveal a particular human experience. The question grows out of an intense interest in a particular problem or theme. The humanistic research question has definite characteristics which include the following themes:

1. It seeks to reveal more fully the true essence of a human experience and evokes personal and passionate involvement;
2. There is no prediction nor determination of causal

relationships;

3. Qualitative aspects are explored rather than quantitative, and
4. Creative renderings such as careful descriptions, illustration, and dialogue provide the meaning rather than measurements, ratings or scores.

Conceptual frameworks for new paradigm research in human sciences include phenomenology, heuristics, hermeneutics, and participant-observation research. No single model of humanistic research will satisfy the range of values, interests, concerns or styles of humanistic researchers. The intent of this paper is to concentrate on one model; the model of phenomenology as facilitative of a human science research interest. Phenomenological research is the study of ordinary, everyday phenomena. The philosophy as well as the methods and procedures for conducting a scientific investigation via phenomenology are explored along with a description of the nature of phenomenological research.

A qualitative research model, the guiding framework of this paper, is an appropriate vehicle for the investigation of the human condition, as it allows the researcher to discern meanings from the total human experience. Phenomenology offers a guided structure for obtaining descriptions of experiences as they appear to the experiencing person. As Erazim Kohak (1978) states: "...we as humans, experience before we theorize and what we theorize about is primarily given as lived experience...To provide a firm foundation for our propositions about objects and subjects, we need

first to grasp clearly the lived experience on which they are all ultimately based" (p.3).

The understanding as well as the process for producing scientific research by phenomenology offers an approach toward gaining a deep and more meaningful understanding of human experience. The qualitative dimension encourages the investigator to become a co-researcher to participate in a joint venture. It is based upon mutual trust, a respect for the subjective nature of meaning, for knowledge as transaction and for science as a process. It is a search for meaning rather than measurement and requires disciplined personal commitment.

Phenomenology seeks to articulate explicitly the implicit structure and meaning of human experience. The data sought is qualitative, consisting of detailed descriptions of situations, events, interactions, and activities obtained directly from people about their own experiences. To paraphrase Michael Patton, (1980), this data is considered empirical and collected as open-ended narrative without attempting to fit people's experiences into predetermined standardized categories. The relevance of this type of data base is further developed in a quote from Combs, Richards and Richards (1976), "People do not behave according to the facts as others see them. What governs behavior from this point of view are the person's unique perceptions of himself and the world in which he lives, the meanings things have for him" (p.20).

Research conducted in this way, fits beliefs regarding

the dignity of human beings, a sense of truth that exists within people, and faith that a being, given the freedom, has the capacity to communicate verbally who he/she is.

METHODOLOGICAL OUTLINE FOR HUMANISTIC PHENOMENOLOGICAL RESEARCH

A. Processes

The study will be guided by four core processes of phenomenological research. The major processes include Epoché, Phenomenological Reduction, Imaginative Variation, and Synthesis. In order to embark upon the journey of doing research phenomenologically, it is essential to adopt a perspective that is sufficiently detached from everyday experience, in order to scrutinize it.

1. Epoché.

To listen phenomenologically is to set aside the "natural attitude" or to Epoché. It is essentially a stepping back from presuppositions of everyday life. To quote Done Ihde (1977), "The first steps of phenomenological looking are usually called an Epoché which means to suspend, or step back from our ordinary way of looking, to set aside our usual assumptions regarding things" (p.37). Edmund Husserl (1952) advocates completing the Epoché prior to gathering data, while Martin Heidegger (1965) postulates that no one could totally transcend ones ego. I believe

that the Husserlian approach is very appropriate to the integrity and authenticity of an investigation. Essentially Epoché is a process through which one is challenged to set aside any preconceptions. Relevant to an investigation this means putting out of action biases regarding the process being studied and entering the data gathering process with a fresh and open mind-set.

2. Phenomenological Reduction.
    a. horizontalization
    b. delimiting
    c. identification of the invariant constituents and themes
    d. development of a fundamental textural description.

To paraphrase Richard Zaner (1970), the process of Phenomenological Reduction consists of four phases, horizontalization, delimiting, identification of the invariant constituents and themes, and the development of a fundamental textural description. Horizontalization is an aspect of listening phenomenologically. To horizontalize is to list every expression of the person interviewed without assuming an initially hierarchy of realities. This prevents one from deciding too quickly that some things are more real or fundamental than other things.

Delimiting refers to a process of reducing and eliminating material that is either repetitive or irrelevant to the study

and arriving at the meaning qualities characterizing the experience. This aspect of the phenomenological process involves elements of qualitative discernment and subjective interpretation. The researcher is called upon to test individual descriptive data for certain requirements and to make decisions of relevance in order to reduce and clarify core descriptive terms. This process helps differentiate experienced from non-experienced data.

The identification of the invariant constituents and themes is a process whereby related expressions are brought together in clusters which are then presented as representative of the whole experience.

By listening phenomenologically, reduction allows the researcher to develop a textural description that reflects the feelings of the co-researcher. In following the tenets of phenomenology, the researcher keeps in mind that it is through description, or through contact with personal language that one is able to enter the world of the describer; therefore, the textural description refers to the feelings and material aspects of the experience. Structures and universal themes based upon the utilization of such universals as time, space, relationship to self, and relationship to others are developed.

3. Imaginative Variation.

Imaginative variation is a systematic varying of possible meanings to develop a structure. It is systematically varying

the possible meaning that a given phenomena can have.

4. Synthesis

The final phase of the phenomenological process calls for a synthesis. The synthesis will comprise a review of all materials and an integration of textures and structures, to arrive at the essence of the phenomena being studied.

Analysis of data must be unbiased. Phenomenological reduction is complete when themes or patterns have been distilled from the data and when the essence of a phenomenon is fully disclosed through textural and structural description.

B. Methods and Procedures.

1. preparing to collect the data
2. the collecting of data
3. organizing, analyzing and synthesizing of the data

A conceptualization of the methodology for a research study of this nature consists of the following phases: preparing to collect data; the collecting of data; and the organizing, analysing and synthesizing of data.

In preparing to collect data, it will be necessary to envision mentally everything that will be needed to operationalize it, and to fully understand the nature and meaning of human science research. Accepting the challenge for conducting this mode of research then calls for the formulation of the research question. Formulating a question that is full and clear requires that the researcher specify what she or he wants

to know. This involves a disciplined, rigorous, reflective process and continual re-examination of concepts, issues, themes, and experiences. Having reflected on and formulated a question that is personally and socially relevant, the researcher will be ready to conduct a literature review and to determine the nature of the study.

The next phase of preparation will involve developing criteria for selecting participants. A list of criteria might include the following: people who easily and effectively articulate their thoughts and feelings, who have an interest and willingness to participate in a research study, and who are available for interviews. Further, the co-researchers should be asked to agree (having been provided with relevant information regarding the nature and intent of the study) to provide a signed permission to permit the material to be used in a manuscript or other publications.

C. Method of Collecting Data

Data is gathered through the exploration of lived experience which provides material that might eventually have a bearing on the developing of a deeper understanding of the nature of the phenomenon. This data will likely be obtained through inverviews. In applying the interview method an atmosphere for open communication and dialogue, offering open-ended statements as a way of bringing co-researchers to a focus while allowing for many possibilities for describing the experience must be created. Data collection can begin

by engaging in Epoché. When using the Husserlian approach, enter each interview having completed Epoché, meeting with the co-researcher with a fresh, unbiased mind-set that is open to any and all possibilities.

Qualitative data consist of detailed descriptions of situations, events, people, interactions, and observed behaviours; direct quotations from people about their experiences, attitudes, beliefs, and thoughts; and excerpts or entire passages from documents, correspondence, records and case histories. The data are collected as open-ended narrative without attempting to fit institutional activities or people's experiences into predetermined, standardized categories such as the response choices that comprise typical questionnaires or tests (Patton, 1978).

D. Phenomenological Reflection

Having collected the data, the material from a verbatim transcript of each interview will be organized, analyzed and synthesized.

Reduction and elimination consist of sifting through the data for expressions relevant to the study and meeting the following requirements:

1. Does it contain a moment of the experience that is a necessary and sufficient constituent to understanding it?
2. Is it possible to abstract and label it?

Related expressions will be brought together into clusters,

which will be labeled and serve as representatives of the whole. Recurrent features are identified using a classification system.

Qualitative analysis is addressed to the task of delineating forms, kinds, and types of social phenomena. Textural and structural descriptions which reflect the essence of the experience are developed. In developing a textural description of the experience, the researcher is guided by an understanding of listening and looking phenomenologically, allowing the feeling and material aspects of the data to emerge, and creating a full, accurate, and vivid textural description of the experience.

Having developed a textural description, an elucidation of the essential features or essences of the phenomenon is developed. These are the structural features, emerging from implicit understandings and intuitive judgments. Moving from texture to structure involves considering the unique event intensely and completely, and construing it as an example of the structure of human experience in general.

Moving toward meaning involves an integration of the co-researchers' experiences with the meaning of these experiences. The process of coming to a textural-structural description is interpretive as well as intuitive, and seeks to articulate a further understanding of the lived experience. Integrating the experiences will provide the meaning for the study.

E. Validity

Some authors suggest that qualitative researchers have not been as scientific or objective as quantitative researchers (Kirk and Miller, 1985). Since the researcher is viewed as an instrument, and as a human instrument may be value laden, team researchers may be a solution in providing checks of validity through mutual consultations and sharing insights (Rosenbaum, 1987, p.57). When multiple methods, data sources, and researchers are used to enhance the validity of qualitative research findings, realistically one can occasionally end up with data that converge. Frequently the data will be inconsistent and even contradictory (Mathison, 1988).

Without having these arguments settled qualitative research is rapidly gaining a widespread acceptance with scholars.

In summary, phenomenological studies do not seek to offer advice or prescribe behaviour, but rather they suggest openings and possibilities for awareness, insight, and action that are inherent in the self-search and self-reports of participants. The studies address the wholeness of the experience encompassing psychological, sociological, biological and spiritual dimensions. They bring together the situational with the experiential and synthesize the experience in a way that reflects the totality and wholeness of a critical human experience. A phenomenological approach seeks a different end than empirical studies--not a body of true propositions about people; but a fuller appreciation of the totality of

the human experience.

Qualitative research is concerned with meanings, not measurements; with essence, not appearance; with quality, not quantity; with experience, not behaviour.

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USING AMIGA COMPUTERS FOR MEDIA PRODUCTION IN SUPPORT OF TEACHING AND LEARNING

by

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Two years ago at our annual Production retreat the team decided to embark on a new goal: Accelerate the move from analog to digital in the production of teaching and training multimedia materials. Of course, this meant integrating computer systems more fully throughout our production facility.

One might ask, what is so special about digital? We narrowed it down to 4 main issues. First, the need to continually update material is made easier in the digital domain. The ability to work interactively with multimedia is enhanced greatly with digital data types. Our clients were increasingly forcing the digital issue by bringing our unit digital files for customizing or output to various media. And finally, we all recognized that the exploding information society made working in digital imperative for survival!

We have made a lot of changes to our production areas and at the same time have had to re-think our methods of producing media materials. Through it all, the only constant has been continual change. Our creative team barely has time to catch its' breath before the next multimedia wave rolls in. At a recent satellite conference a media producer used a phrase that evokes a vivid picture in the mind. He said, " Keeping up with multimedia is like drinking from a fire hydrant." Many of us who have read numerous computer manuals and magazines know how true that is.

Along the analog to digital journey we have compared notes with many colleagues and it seems most of us are moving in the same direction: converting files for output to slide and overhead; creating digitized audio and visual resources for professors to use in the classroom with LCD panels hooked up to cpu's; and multimedia carts starting to emerge in many institutions. The list goes on and on.

Recently, even the NAB (National Association of Broadcasters) recognized the digital multimedia juggernaut by adding Multimedia World to it's annual conference and trade show. CEO John Sculley of Apple Computers became the first non broadcaster to give the opening keynote address. He was followed the next day by Lucie Fjeldstedt, VP Multimedia at IBM who gave a dynamic presentation outlining how digital multimedia was already changing how we live, work and learn in North America.

Three issues were common to both their presentations. First, that the building of a national digital data highway is as important to our international economy as our current network of roads, airports and telecommunications. Second, interactivity is a key element in any type of communications tool whether it be for entertainment or teaching and learning. And finally, digital compression technology will likely have the same impact on our society as the microprocessor. The implications of digital compression for multimedia production goes far beyond non linear editing - which has been the most visible use in our industry thus far.

With the goal of moving from analog to digital firmly in mind we made a number of physical changes to our production areas. Let me take you on a room by room tour.

A. Post Production Edit Suite:

Here we start off with a rack of three Panasonic M2 AU650 vcr's, a Ross 210 switcher and an Eela 8 channel audio board. To this we added an Amiga 2500 with NewTek's Video Toaster system. For AB roll computer control we put in an Amilink computer editing system based on V LAN technology. Our technical team also designed and built something we call a Multimedia LAN to allow increased capability to share cpu resources amongst three areas. We'll expand on that later. The main benefits were as follows: integrated edit decision lists; digital still store capability; 2D and 3D animation; 7 input switcher; chroma fx; enhanced character generation; 24 bit digital painting; video frame capture from videotape or camera and custom digital video effects.

B. Production Control Room:

We replaced a 20 year old CDL switcher with a Video Toaster system. We designed it so that the Video Toaster switcher could be easily taken out on location as a portable switcher. The monitor bay was set up to run in two configurations by simply moving a few U links in Master Control. Normal configuration is when we use the room for videographics creation (2D/3D graphics and animations) and digital input/output. Videographics are created with an Amiga 4000 which has an Advanced Graphics Architecture. An IV24 board is used for genlock/overlay; 24 bit painting/image processing; transcoding various formats (S-VHS to/from M2 being the most common); and digital capture of analog elements. The other configuration is when we use the room as a control room for studio productions and live satellite uplinks. This room also houses a video copystand, flatbed scanner and access to M2 vcr's for input and a Polaroid image recorder for output to 35 mm slide and overhead transparencies.

B. Production Control Room (Con't):

Our staff is currently undergoing training to develop digital photography techniques. One of our first projects was to convert a professors' slides to digital files and write them onto a CD ROM.

C. LAN/DTP:

Having a digital production facility is impossible without a solid, reliable client/server infrastructure. York University has been moving to a distributed computing environment which means that each department can customize its' server to its' own requirements. Our main server is Unix based with a Sun computer which works in tandem with a sub-server Amiga running Unix as well. The network connects any and all computer platforms with the main workstations being MS DOS or Amiga. In this area there is a multipurpose MS DOS system that is the front end to updating MS DOS applications on the server as well as functioning as a multimedia development station. A second Amiga performs the same front end role for Amiga applications as well as providing desktop publishing support to the unit.

D. Audio Control:

Here we installed a rugged 16 channel DDA board that can also accompany the Video Toaster system on location. A voice over booth is adjacent to this room which also has access through our custom Multimedia LAN to cpu's from two other locations. The significance of this is simply that again this room is multipurpose. When needed, this room can function as a production control room using the Video Toaster from another room as switcher enabling one person to switch and do audio for a studio taping. Also, this room can function as an edit suite by accessing M2 vcr's via a control card in yet another cpu. Once again the monitoring is set up to be easily changed from one configuration to another by simply moving a few U links in Master Control. Perhaps the most important function of this room is to perform digital non-linear audio editing. All voice overs are now recorded to a hard drive and changes are done by cutting and pasting - much like one would do with a word processor.

E. Studio, Multimedia Videoconferencing and Training:

The 30 x 40 traditional studio with lighting grid has now been partitioned with a portable drapery system to allow for a videoconferencing board room on one side and a portable riser/seating system on the other. Both of these can be removed to allow for full multi-camera studio taping and live to satellite uplinks. In the board room there is a VideoTelecomm videoconferencing system (codec, computer, remote control camera, etc) for distance education slow scan television via telephone lines. Multimedia teaching supports include: electronic white board (which also serves as a large video display when used with an LCD panel); Elmo visualizer for hard copy, overheads, or 35 mm slides; fax machine; Overhead projector and LCD panel; touch pad with visual interface to control camera(s), computer displays with live annotation, and a custom lectern for ease of access to equipment. For larger distance education classes the drape partition and board room is removed providing riser seating for up to 35 students. Experiments are being conducted to allow interconnection between the videoconferencing studio and larger lecture halls on campus - allowing the combination of both to go out over telephone lines. This multipurpose facility can also be used for satellite downlink of education broadcasts and for multimedia teacher training where professors' can practice using various equipment and multimedia resources.

F. Multimedia Authoring, DVI (Digital Video Interactive) and
CD ROM pressing:

Currently under development this room is starting off with the following: an IBM Ultimedia DVI Workstation which can also be used for computer based presentation/authoring projects, graphics for slide and overhead output as well as DTP (Desktop Publishing) support and a Sony CD ROM writer which allows us to press computer files onto a conventional CD ROM. This Workstation lays the foundation for digital non-linear editing of all data types.

Other Issues:

Multimedia LAN (Local Area Network):

In addition to a conventional computer LAN which allows sharing of hard drives, printers etc. we have developed a custom Multimedia LAN. Thus far it connects three of our main production areas allowing for greater efficiency and hardware backup. Essentially it is a hard wired system that allows the keyboard and mouse in each area to access more than one cpu and monitor it in RGB as well.

Multimedia LAN (Local Area Network) Con't:

Foremost among its' benefits is that we can dedicate an audio or video card in one cpu but access it from any of the three rooms. This cuts down on hardware duplication or having to physically move cards from one cpu to another depending on what the project requires. It also allows a creative synergy between operators in the various rooms as they share resources and delegate audio/video sections of a project, which is then combined later for a final product.

The Creative Team:

Any digital production facility is marginally useful without a dedicated and creative team of people. In the Instructional Technology Centre we have been re-skilling our people to be multitasking as well as conversant with all computer platforms and techniques to blend analog with digital resources to create effective multimedia teaching materials. Currently the team includes: Senior Multimedia Designer; Technical Operations Supervisor; Digital and LAN Specialist; Photographer (both conventional and digital); Junior Multimedia Designer; Maintenance Technician; and a Manager of the unit who also serves as a hands on Producer/Director on many projects.

Summary:

In two short years and during a time of financial constraint we in the Instructional Technology Centre feel that we have made great strides towards our goal of becoming a Digital Production Facility. This has been accomplished through a dramatic re-skilling of our creative team and extensive redeployment of existing resources in combination with some new equipment. Marrying the old with the new would have been impossible without fresh thinking on the part of the team as to the process of creating multimedia materials. It has also meant a great deal of re-wiring and revised documentation of our physical plant. Our faculty and staff continue to bring us new digital challenges and "stretch the envelope" towards using multimedia in teaching and learning. This is only natural at a university where the motto is: "The way must be tried."

MUSIC IN EDUCATION

presented by
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The implementation of technology can have either a positive or negative impact on the classroom environment. Technology as a tool in the classroom, can enhance the level of learning in any subject area. On the other hand, technology can be a deterrent to the learning process in a subject if in fact the emphasis in the learning process shifts to the use of the technology as opposed to the basic elements of the core subject.

Inappropriate use of technology with selected software programs has the ability to bypass critical fundamental elements during the learning process of a given subject if the integration is not methodically aligned with the learning goals at the curriculum development stage.

In some music classrooms, through the fragmented use of technology, we are decreasing music literacy content and replacing it with exposure activities, which is only one component of music instruction.

In 1987, Yamaha Corporation of America gathered some 30 educators in both the academic and music areas from elementary through to university level as well as technology and industry people.

The following question was posed and the assessment was to be concluded without economic influence.

"What are the current needs in the school music classroom?"

As a result, the following conclusions were reached.

- address the decline in music participation in schools
- recognize technology as a threat and a opportunity
- generate music literacy in the classroom

Philosophically: "to create a classroom music program that provides a contemporary focus to the musical and curricular traditions of the general music classroom. Supporting this philosophy is the deeply-held belief that every child should have a sustained education in music. On these beliefs rests the foundation for Music In Education."

Change is a given constant in the human experience. Those evolutionary actions that take place throughout humankind and society, education, technology, and in music making and learning, each create new challenges and opportunities, even for musicians and music educators. Rapid changes in technology, coupled with dramatic changes in the organizational structure of schools and learning, means that music education has unique opportunities available to it as at no other time in its 150 year history.

As technology provides new listening and performing options to our society, today's students have increasing access to and active engagement with music as never before. These increasing musical options are not available in the majority of the music classrooms nor are they under the guidance of music educators. Because technology provides personal alternatives in music for which we have few school instructional programs, our traditions of school music education may be jeopardized by the very advances in technology intended to increase the ability of every individual to make music. A primary goal of Music In Education is to provide students with the ability to become frequent participants in the music-making process, rather than infrequent and often passive onlookers. Technology allows this to happen. Increasing student participation in the music-making process is as important to music education as is the development of readers to the continuation of a literate society.

Bridging the contrast between what occurs in classroom music today and the access and interest that students have personally with music and technology outside of that classroom, is a constant challenge for music educators. Blending the personal musical experience of the student with the existing traditions of school music, integrating new technologies with traditional experiences, giving students new perspectives in music making - these are the goals of Music In Education. Students are in need of opportunities that increase their willingness to fully participate in the music-making process. Thus, the dichotomy that exists between the current use of music in our culture, versus the declining opportunities to study music in the schools must be assessed.

There are six basic concepts that guide Music In Education program design:

1. Curriculum and instructional material are central to the program, and provide a logical enhancement of teaching and learning into all areas of the curriculum.

2. Technology is an important component, and has been integrated so that it is an outgrowth of the instructional purposes of the program. The technology in the Music In Education program is a tool with which to teach, rather than a separate subject that has to be specifically taught.

3. The class group is the primary vehicle of instruction. Technology, the unique curricular design and cooperative learning experiences are directed toward reaching groups of learners, yet concurrently recognize the special learning and perpetual needs of the individual.

4. Instructional components include measures to assess students understanding, perception and achievement. The musical growth and understanding is essential to the success of the group.

5. Student musical experiences have an application beyond the music classroom experience, personal use in the home, and in the development of lifetime participation with music.

6. Curriculum materials recognize and respect the traditions of classroom music and our rich cultural heritage, and provide a bridge between those traditions and a contemporary setting for instructional materials.

The Music In Education curriculum is sequential and comprehensive. Built upon an increasing hierarchy of musical concepts and experiences, the curriculum is designed to systematically provide students with musical knowledge that they can use to express their own creativity. Each component of the curriculum materials, teaching strategies, listening and review and quiz, provides a structured and comprehensive musical experience that relates to the systematic acquisition of musical skills and concepts (rather than random usage).

The curriculum is intended to be interactive with other methods or materials. While the sequential structure of a curriculum is critical an any academic study, a curriculum is essentially a framework on which to organize learning experiences.

The design of Music In Education curriculum components and instructional activities is intended to stimulate the development of personal musical skills through four distinct areas of experience: listening, discussing and describing, making, and creating.

The curriculum is organized into 145 modules, and the material found in each module reinforces these four experiential areas. Each series of learning strategies in a module focuses on the development and understanding of specific concepts, and the acquisition of musical skills, through the interaction of these four areas.

The rapid advancements in music technology over the past decade have provided options in hardware and software that can significantly enhance the instructional climate of the classroom. By allowing technology to provide extensive opportunities for student participation, Music In Education supports a sophisticated information network for both classroom instruction, and management. In this concept, the technology supports the integration of many hardware and software components. This includes Macintosh computer, MIE-1 keyboards, mixer control box, remote control, and compact disk player. Instructional and management aspects of the program are implemented through the system by the software.

The computer plays a critical role in the Music In Education program. It functions as the primary tool that integrates and synthesizes the many technological components into the instructional process. The computer provides the teacher with instructional flexibility, diagnostic ability, and management assistance. The computer enhances the student keyboard with far greater individual power than a typical electronic keyboard might otherwise possess. By use of this technology, it allows the teacher and students to have direct and instantaneous access to instructional, review feedback and evaluation activities.

The student entry port to the system is via the keyboard. We must remember, the computer is not a musical instrument. In Music In Education, the primary source of musical learning for the students is through their ears, voices, movement and musical instruments, including the MIE-1 keyboard.

This is a comprehensive and sophisticated computer -assisted instruction software program that provides activities in four major areas: lesson planning, instructional activities, testing and evaluation, classroom management and record keeping. The software was conceived and developed with the express purpose of providing teachers and students with a powerful tool to assist music learning.

The integration of instructional activities, including listening and review and quiz, extends significant flexibility to the teacher for both classroom planning and the ability to easily shift to different instructional activities during the class without extensive preparation time. The software is especially responsive to the teaching situation because of the remote control, which allows the teacher the ability to control the software from anywhere in the classroom.

The combination of instructional and management/record keeping functions in the software continually updates both class and individual records, providing access to group and individual achievement data, attendance files, seating charts, schedules, grades and curriculum progress and planning.

The program has been available for implementation only in the Province of Ontario since the summer of 1992. In a review of the progress and results to date in three separate schools (Centennial Central School, Comber; Holy Spirit Elementary School, Scarborough; Brebeuf High School, Willowdale), the following conclusions were reached.

- **Participation in music class activities:**
  Higher participation, much improvement. Particularly grades 6 through 8. Hands on activity with keyboard a major influence. Students take more risk by comparison to other music class environments because they are all on basically the same playing field.

- **Learning ability:**
  Note reading much faster which has contributed considerably to senior choir performance level in the school.
  Music literacy development much faster rate. Approximate 4 times development rate by comparison to primarily performance based curriculum concept.
  Higher visual and aural understanding of musical concepts within each lesson module as it is taught.

- **Discipline:**
  Improved with much less problems, particularly grades 7 & 8. Younger classes less inhibited/intimidated by performance areas. Singing very threatening to many male students in grades 7 & 8. Other aspects of curriculum as alternative able to attain the same understanding levels of a specific concept. Cooperative learning, peer pressure to maintain discipline in classroom. Students check each other.

- **Curriculum:**
  Complete. Building new knowledge on top of old. Upward spiral structure in curriculum. Flows well in lesson plan.
  Allows flexibility in classroom activity with good foundation to work from. Meets multi level student growth needs.
  Attains four basic learning elements of listening, describing, making and creating in each lesson plan.

- **Hardware:**
  Visual, tactile. Keyboard is a contributor to positive classroom environment. Comparative to social activities, experiences in music.
  Well suited for elementary/general music program.

- **Software:**
  Multiple teacher/student advantages to learning built into software.
  Easy to move around, flexible, versatile.
  Comparison with high tech social life has direct influence, motivational to students.

Note: In the elementary school environment, student involvement higher than 70% of school population.

Telecommunications Networking for Distance Education

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1.0 Introduction

The growing need for effective systems for education and industrial training has magnified the importance of distance learning, both in advanced and developing economies alike. Furthermore, as the deployment of distance learning proceeds, information technologies, especially the use of telecommunications networks, are gaining increased prominence in the field of education. This paper outlines an approach to telecommunications networking designed for distance education within the developing world, and the development work being undertaken by The Commonwealth of Learning (COL) in this area.

The first two parts of the presentation develop the context in which this work is proceeding, pointing to the relationship between education and development and between technology and education. Secondly, the paper outlines the role of The Commonwealth of Learning, a recently established international organization, in exploiting the contribution that technology can make to widening access to learning and improving its quality. Finally, the author will report on a major initiative underway at the COL aimed at the establishment of a regional telecommunications network for distance education in the Asia-Pacific.

2.0 Education and Development - The Learning Imperative

Research studies have fully documented the critical need for a literate, well educated work force, both in advanced and developing economies alike. In the former, the need to sustain overall competitiveness has placed increasing demands on both the formal educational process as well as on systems for industrial training. In the developing world, there is a like requirement to equip large numbers of citizens with the basic skills necessary for economic and social advancement. For this reason, educational policy has risen to the very top of the public policy agenda in virtually all countries around the world. (1)

Unfortunately, however, this realization has produced a demand for learning that has virtually overwhelmed the capacity of educational systems to meet it, at least through conventional means. Even countries such as Australia and Canada find it difficult to accommodate current demand for post-secondary education, and the scarcity problem will undoubtedly accelerate as trends toward occasional and "adult" learning replaces full-time enrollment as the typical mode of education. If this problem has posed significant problems for relatively wealthy states, it has attained almost "crisis" proportions in those countries with much fewer resources for additional investment at their disposal, and which possess much more modest educational establishments on which to build for the future.

3. 0 Communications Technology, Development and Distance Education

As the magnitude of the 'learning imperative' has grown, it has become increasingly evident that the various economic, financial and institutional challenges facing educational systems cannot be addressed successfully without creating a fundamentally new paradigm for learning, one which will radically alter the manner in which education has traditionally taken place. In designing such new systems and approaches to learning, educational policy-makers have invariably regarded modern communications and information technologies as a vital tool in the reform and reinforcement of existing institutions and procedures. This reflects the rather obvious fact that these technologies have magnified the possibilities for improving the quality and cost of education, both inside and outside of the conventional classroom setting, through "open learning" and distance education. For instance, the refinement of inter-active, multimedia courseware holds particular significance for "open learning" since it greatly facilitates independent, self-directed study. Advances in telecommunications, on the other hand, are having profound effects on the practice of distance education in both advanced economies and in the developing world, allowing the creation of "electronic classrooms" which overcome the geographic barriers that have hampered more traditional modes of instruction.

4. 0 The Commonwealth of Learning (COL) and Human Resource Development

At the international level, a recognition of the strong, causative links between economic and social development, education and communications technologies lead the member countries of the Commonwealth to establish The Commonwealth of Learning in 1988. By establishing this organization, Commonwealth governments hoped to address the difficulties faced by the developing world in responding to the "learning imperative' inherent in development. From the outset, the organization viewed distance education and the application of modern information technology as two of the primary instruments at its disposal in relation to this particular development challenge.

Since modern communications and information technologies can be used both to facilitate the delivery of distance learning as well as to improve communication links between and among educational institutions, it plays two parallel and reinforcing roles within the field of distance learning. In the first instance, communications technology can widen the reach of distance education institutions and expand learners' access to their programs and services. In the second case, technology serves to improve the quality of communications among distance educators themselves, leading to more effective institutional co-operation and resource sharing. This dual contribution of communications technology - to distance education delivery and to institutional networking, is a fundamental premise of COL's charter and its current work plan.

As a result, the Strategic Plan of The Commonwealth of Learning identifies a range of key activities and targets in the area of telecommunications and technology, each of which are central to the organization's core mandate and objectives. The 1990-1993 Plan specifically refers to activities aimed at:

- improving access to technologies for distance learning;

- "establishing a Commonwealth Communications network" encompassing COL and its clients;
- developing and implementing training in the use of distance education technologies;
- developing delivery networks for education and training. (2)

The first two of these activities reflect the need to make distance education technologies ("hardware") more widely available, through programs aimed specifically at the strategic deployment of communication technologies. The latter two activities recognize the importance of training in ensuring that the human resources exist to make effective use of distance education technologies. Some of the specific projects that have been undertaken by the organization are outlined below.

4.1 Delivery of Distance Education

In the application of technology to distance education, COL has placed emphasis on a "model building" approach to project development and implementation. As a result, its technology program consists of a limited number of projects, strategically directed at innovative applications of communications technologies in distance learning, especially those applications which address the challenges facing human resource development in developing countries. Such innovative applications can involve new and novel uses of fairly conventional technologies, or take advantage of more advanced "state of the art" technologies, depending on the needs and capabilities defining a given application. In either case, the successful implementation and utilization of particular technologies can produce positive demonstration or "multiplier" effects, which can provide distance educators, communications suppliers and funding agencies alike with practical models for future, more comprehensive distance education projects.

For its part, The Commonwealth of Learning has concentrated on the strategic deployment of a small number of distance education technologies - audioconferencing and audiographics systems; computers for desktop publishing; and audio-visual programming.

4.1.1 Audio-Teleconferencing

The application of voice-based teleconferencing technology has gained increasing prominence in modern distance education, especially as a complement to traditional print and postal-based methods. In contrast to more passive, static techniques of instruction, telecommunications-based technologies such as audio-conferencing allow for fully interactive communication between the students and the instructor/tutor. Audioconference systems, which consist of special loud-speaking telephones interconnected by means of a conference bridge, enable multiple locations to be in simultaneous communication with each other, creating a virtual classroom. Recently the addition of computers to such a network permits the transmission of simple pictures and diagrams in both directions over the same basic telephone circuits, thus creating an electronic "blackboard" that adds further realism to the "distributed classroom" concept.

To demonstrate the effectiveness of these techniques in education, COL has instituted pilot audio teleconference projects in several Commonwealth countries, including Guyana, the Solomon Islands, and Mauritius. Other systems are ready for implementation, and several more are in various stages of the planning process.

4.1.2 Desktop Publishing (DTP)

The application of technology to distance education does not diminish the need for large amounts of printed material essential for the effective delivery of distance education courses. It is recognized that distance learning courses require more effort in their planning and delivery than face-to-face teaching and the printed course material must be of the highest quality in design and content. The use of desktop publishing (DTP) units, which consist of properly equipped personal computers and software, to provide high-quality, print-ready material is an example of the direct application of technology to greatly improve efficiency in the preparation and delivery of course material. Course designers are able to retain closer control over the course presentation, over the use of graphic illustrations and over the final product right up to its delivery to the print shop. The provision by COL of such "enabling technology" encourages Commonwealth educational institutions to use and adapt other forms of technology for the benefit of their teachers and students.

COL has provided DTP units, and the appropriate training in their use, to more than a dozen educational institutions, in Commonwealth countries such as Botswana, The Gambia, Ghana, Guyana, India, Jamaica, Malawi, Mauritius, Namibia, Nigeria, and Sierra Leone. Provision has been made as well for DTP units to be provided to the Allama Iqbal Open University in Pakistan.

4.1.3 Audio-Visual (A/V) Programming

Despite rapid advancements in electronic media *(audio, video, radio and TV)*, a vital element in the delivery of distance education, many developing countries in the Commonwealth have been unable to exploit the full potential of these media because of capital costs of infrastructure and costs of production. Consequently COL has initiated a number of projects to enhance the use of A/V Programmes in distance education. These initiatives include the development of mechanisms that facilitate the exchange of existing A/V Programmes and also the production and acquisition of new material on selected subjects. Examples of such initiatives are:

- The initiation of the Commonwealth Educational Media Resources Programme (CEMREP);
- Acquisition of a Licence to distribute science video programmes from Encyclopaedia Britannica; and
- Acquisition of video programmes from educational institutions in India.

To support production of A/V Programmes on selected subjects, COL has commissioned Indira Gandhi National Open University to produce a set of video programmes on Ecology. In addition, COL took advantage of the presence of a large number of experts in Distance Education at the ICDE 16th World Conference, held in Bangkok in November 1992, to record a series of video programmes on various aspects of distance education.

4.2 Institutional Networking

The expansion and improvement of communication among distance education institutions represents a second important contribution of technology to the furthering of distance learning. In addition to their value in the exchange of material for the production, adaptation and delivery of distance education courses, communications systems provide the means for cooperation in a more general sense, on such matters of common interest as policy and planning activities, administrative techniques, and research. In this respect, technology can help to foster cooperation on a bilateral basis and to strengthen institutional infrastructure on a regional and trans-national basis, such as the distance education associations being formed in western and southern Africa.

4.2.1 Asia/Pacific Network Study

At their meeting in Vancouver in April, 1991, the COL Board of Governors directed "that a study be undertaken in the Asia-Pacific region to determine the possibilities of establishing a COL communications network there." A comprehensive feasibility study of such a network is underway, utilizing COL staff resources as well as those of the Vancouver telecommunications research and consulting firm, MPR Teltech. Based on extensive consultations with the educational and communications communities in the Asia-Pacific region, the study will identify current and future educational needs for the region and the associated telecommunications requirements, and will assess the extent to which a multi-purpose, user-shared network could be designed and employed to meet these needs. The results of this study and type of network it envisages will be examined in greater detail later in the paper.

4.2.2 COL Videoconferencing Network

With technological advances, the emergence of international standards, and rapidly declining transmission costs, videoconferencing will become a major vehicle for communications in the 1990's. In addition to its employment for business consultations of all kinds, the use of videoconferencing for instructional purposes has begun to grow; initially, for industrial training purposes, and increasingly for distance learning purposes within formal educational programs. The acquisition of a videoconferencing capability for COL, starting with the headquarters facility in Vancouver and the one at the COL/Brunei Centre for Professional and Continuing Education, represents an invaluable instrument for improving inter-institutional communications and positions COL in the forefront of examining innovative applications of videoconferencing for remote learning.

The headquarters videoconference centre has been in service since April of 1992, and possesses the capability of utilizing both dedicated broadband facilities as well as "narrow-band" conferencing (using ordinary telephone lines), thus decreasing the cost of international link-ups. The latter, "compressed video" mode of conferencing is carried out by means of a Mitsubishi "codec", which was installed in the Fall of 1992. The Mitsubishi equipment is fully compliant with the CCITT's international standard for compressed video, H.261, and has been used to communicate with a number of sites using equipment coming from a range of suppliers.

Installation of a second videoconferencing facility took place at the Centre for Professional and Continuing Education at the University in Brunei in October 1992, also using Mitsubishi supplied terminal equipment and codec. Special arrangements have been made to take advantage of digital (ISDN) circuits for a direct Canada-Singapore-Brunei link when they are available sometime in early 1993, and on the local level to connect the learning centre with Brunei's international gateway. An official inauguration of the centre and the videoconferencing system took place during the Board of Governors' meeting in Brunei in November 1992.

4.2.3 Satellite Systems (VITA) Project

Communications within and between developing countries can often be difficult and transmission of printed material slow due to the lack of available infrastructure. In attempt to address this problem, COL has agreed to provide, in cooperation with the of Volunteers in Technical Assistance (VITA) organization, the equipment for a satellite network based on VITASAT, which combines the use of packet radio and low-earth orbiting satellite (LEO) technologies in order to provide electronic mail capability to widely dispersed, remote locations. A trial of the network's capabilities for distance education will take place in West Africa, and will involve the National Teachers Institute of Nigeria, which has agreed to make available its learning materials and expertise to assist The Gambia (Gambia College), Ghana (University of Ghana) and Sierra Leone (Freetown Teachers College) in introducing teacher training programmes.

This network will permit information to be both sent and received by all four of the locations in Africa plus COL headquarters within the same day. The information exchange in this environment, while not interactive, is timely and reliable for relatively low expense and can be of benefit to all participating institutions. At present COL is progressing with the licensing and subsequent installation of the ground station in British Columbia serving COL headquarters, and at the same time working with the authorities in the African Countries involved to acquire licences for their respective ground stations.

4.2.4 Electronic Messaging Networks

The need for improvement of communication within the Commonwealth educational community through electronic mail or other computer-based messaging systems has often been noted in COL's strategic and operational plans. Although several networks are theoretically available world-wide through Internet, there is no dedicated network that provides ready access to computer-based communications to educators throughout the Commonwealth. A number of possible avenues have been examined, aimed at the utilisation of existing network infrastructures to initiate a Commonwealth electronic network, including:

- VITASAT and VITANET focusing on African Commonwealth countries;
- the APFNET developed by the Asia-Pacific Foundation in Vancouver; and
- C-Link, a commercial service provided by COMSAT/Inmarsat and based on land mobile satellite technology.

As noted below, future planning will focus on an Internet based network, which will interconnect to, and operate with, commercial data communications services and with customized networks such as the COL/VITA satellite system.

4.3 Planning and Advisory Functions

In addition to the strategic deployment of communications technology, COL has also been active in distance education delivery in a planning and advisory capacity. In the past year, two major consultations have been completed in support of distance education planning. In Namibia, for example, COL provided specialists to the Government of Namibia to assist in the planning and development of distance education of educational broadcasting and the establishment of Namibia's College of Distance Education. COL also assisted the Namibian Broadcasting Corporation in the planning of a training programme for its Educational Broadcasting Unit.

In the West Indies, at the request, and on behalf of the Caribbean Development Bank (CDB), COL contributed expert advice in respect to a proposal by the University of the West Indies to enhance their existing Distance Teaching Experiment (UWIDITE) facilities. As part of this $10 million (U.S.) project, COL undertook a study of the telecommunications requirements for the network and the infrastructure available within the region. Its findings were incorporated into the CDB Appraisal Report on "Continuing Studies and Distance Education Improvement/Expansion UWI - Regional", which came before the Bank's loans Committee in October, 1992.

4.4 Training in Distance Education Technologies

As more technology is introduced throughout the educational community, the need grows for trained personnel to use and maintain distance education systems and services. Training in the use of telecommunications equipment in media production and computers has therefore begun to feature more prominently in COL's work, in response to increasing demands from the clientele. Specific training projects have included: educational radio production skills for staff from both the Namibian Broadcasting Corporation and the Namibian Ministry of Education and Culture; assisting the Caribbean Broadcasting Union (CBU) to provide training for staff from its member television systems in the Commonwealth Caribbean in the production of educational television programmes, as well as assisting the CBU in the holding of a workshop on educational programming for the programme managers and directors of these same systems; and providing training in the skills needed for field-based programme production in Ghana. In telecommunications, a series of handbooks and training manuals have been produced, designed for instruction in the use and application of audio conferencing. This material will be made available for use at locations equipped by COL with audioconferencing equipment, as well as for general training purposes.

4.5 COL's Strategic Priorities

4.5.1 Network Development

Within the above framework, COL proposes to undertake a series of strategic initiatives revolving around the development of network infrastructures for distance education, in the fields of telecommunications, educational broadcasting and computer communications. In

the realm of telecommunications, major emphasis will be placed on the design and development of regional network architectures for distance education. A central component of this effort will be the finalization of the Asia-Pacific Network Study and an assessment of its responsiveness to the needs of the Asia-Pacific as well as its applicability to other regions. The gradual extension of the COL Videoconferencing network linking major centres of distance education within the Commonwealth will also figure prominently in telecommunications networking activities. Beginning with the COL headquarters and Brunei sites, the network would interconnect "centres of excellence" and distance education "hubs", furthering inter-institutional communication and facilitating collaboration in the delivery of remote learning. The further development of a Commonwealth Educational Programming service is a second area of infrastructure development. In collaboration with the Commonwealth Broadcasting Association and Canada's International Development Research Centre, COL is examining possible mechanisms for developing a package of educational programming and its distribution to broadcasters and educators within the Commonwealth. Along with CEMREP and other programming initiatives, these efforts will form the foundation of a comprehensive scheme to widen and enhance educators' access to quality audio-visual programming on an affordable basis. Finally, work will focus on the implementation of a COL-based Electronic Information Network, which will utilize existing computer-communications infrastructure, i.e. the INTERNET, in concert with satellite technology, for the purpose of exchanging electronic mail and other messages among Commonwealth educators. In later stages of its development, the Network will enable educators to have ready access to electronic databases and other information resources available by means of computer networking.

4.5.2 Training

In addition to specific training assistance, priority will be attached to regional-level training initiatives that concentrate on skills development with respect to the communications technologies used for distance education, concentrating on educational media and on telecommunications applications. In the field of educational media, covering the skills involved in the delivery of educational material by means of radio and television and other audio-visual media, COL will establish a Commonwealth Educational Media Training Program to launch and co-ordinate a wide range of communications technology training activities. Telecommunications training will be the core element of COL's collaboration with the Commonwealth Telecommunications Organization (CTO), initially aimed at strengthening existing programs and training centres located in Africa, through the addition of distance education capabilities. Using CTO's telecommunication training courses, COL will assist in their adaptation to a distance education mode and in the design and equipping of one or two training centres that could be linked together for the purpose of distance instruction. A final regional initiative for technology/training will concentrate on the need to upgrade desk top publishing skills for distance education. In this case, West Africa would be the focus for training activities, utilizing voice conferencing and computer networking where practical.

5.0 Networks in Distance Education

As witnessed by the range of technologies in which COL is involved, telecommunications is only one form of media that can be employed for distance education; it exhibits, however, a number of unique advantages in relation to the tasks being undertaken by the COL and with respect to distance education more generally. As a medium of instruction, for example, the immediacy and inter-activity characteristic of telecommunications networks brings a dimension to the learning environment that is unavailable through print-based, radio or television media. At the present time, many of these features of telecommunications are being exploited through a whole range of new services and applications, such as audio-teleconferencing, audio-graphics, computer-based messaging (E-Mail) and computer conferencing, and most recently videoconferencing. Moreover, telecommunications links provide the most effective means for improving the effectiveness of inter-institutional cooperation, in areas like administration, planning and research. In this respect, telecommunications performs an analogous function to its role in a commercial enterprise, by allowing institutions to operate their distance education "business" more efficiently and productively.

In our view, technological forces will increasingly strengthen the pre-eminence of telecommunications in designing cost effective learning systems. New transmission technologies, such as fibre optics, and digital compression techniques, are permitting the rapid deployment of larger and more versatile communications "pipelines" capable of carrying huge volumes of information on a single distribution system. In addition, advances in computer technology will permit the packaging of these huge volumes of information in a more compact and functional form, corresponding more and more closely to the dynamics of face to face communications.

Ultimately, the combination of these forces will produce multi-purpose communications pathways capable of meeting a diverse range of commercial, cultural and educational needs, at lower costs and with greater effectiveness than ever before. Some of these possibilities have already been realized in various pilot projects underway in various parts of the world. The EPOS project, conducted under the umbrella of the EEC's DELTA program, represents probably the most systematic effort to establish a telecommunications network platform for education and training. (3) In North America as well, a number of field trials have taken place, examining applications of advanced telecommunications networking in education.

In contrast to the promise of the technology, however, the reality of the take-up of communications and information technologies in the realm of education, especially but not exclusively in the developing world, is rather dismal. These shortcomings are the primary targets of many of the projects designed and undertaken by my organization, The Commonwealth of Learning, which devotes much of its efforts to making technologies available to educational establishments within developing countries. The installation and operation of audio-conferencing systems for instructional use, and desktop publishing systems to improve production and distribution of print-based materials, are two areas where COL has had some modest measure of success in demonstrating the value of technology in an educational context. Nevertheless, the fact remains that telecommunications and information technologies generally have a rather unimpressive record in assisting educators in the Third World, which is of course precisely the primary motivation for the establishment of an international agency with the mandate like COL's.

A considerable number of factors account for the slow diffusion of information technologies in the field of education. Many of these are common to the patterns which characterize the spread of various types of technologies in other sectors of society. Indeed, the literature on technology diffusion can offer a whole series of complex economic, cultural and institutional factors that determine when and how fast technologies progress. These underlying factors can themselves be the subject of another level of analysis and debate altogether. On a more practical level, however, and certainly in terms of the interests of this particular audience, I believe that there are some more immediate issues that bear on the matter of telecommunications development and education. In my view, this boils down essentially to two rather incontestable facts: first, the lack of a universal telecommunications infrastructure, at least on an international level, which is capable of supporting a truly effective and comprehensive educational initiative on a global basis; and secondly, the absence of a cooperative effort on the part of the world's educational community, crossing national and institutional boundaries, to employ telecommunications networks and services in pursuit of educational goals. Both of these observations warrant some further elaboration.

On the telecommunications side of the ledger, it is generally acknowledged that we remain very far away from the "new interconnected world" pictured in some of the more optimistic views of progress in communications technology. (4) Certainly, the Maitland Commission and other reports before and after it, have authoritatively described the grave imbalances that characterize the world telecommunications system; but what is more relevant, indicated that these disparities will undoubtedly continue to grow in the absence of an international effort to reverse current trends. (5) In the field of distance education, the failure to establish at least minimal levels of public telecommunications in all countries and regions means quite simply that many of the avenues for the use of information technologies in distance education are closed off. Furthermore, the progressive privatization, competition and liberalization of markets and regulation that is underway throughout the world will not in all likelihood improve the prospects for public telecommunications carriers to serve these needs on their own.

For the education community, however, the gradual opening of markets and the appearance of new suppliers and services does provide them with additional means for "self-help", provided that they are prepared to work together to replicate multi-national corporations and large public sector organizations in using "customized" networks that involve a mix of suppliers, systems and services. While allowing the user to take advantage of the economies of large scale telecommunications networking, such an approach would require a sizable joint investment, as well as a high level of co-ordination and co-operation among educational administrations. This would require educators, in effect, to identify and to consolidate their demand for telecommunications, choose the appropriate supplier or suppliers, and to effectively manage the network thus created, on a collective as opposed to an individual basis. To my knowledge, there have been no successful examples of such an enterprise, at least on an international level.

5.2 Telecommunications Networks for Distance Education

In this context, The Commonwealth of Learning recently undertook a comprehensive economic and technical study, aimed at examining the feasibility of establishing a regional telecommunications network for distance education in the Asia-Pacific. As part of the study, a range of technological and costing options are being investigated, based on the premise of a shared, multi-user network which would provide a range of distance education related services and offer several layers of network capabilities. While the detailed study is not yet complete, a preliminary profile of the network is presented in Figure 1 below.

Figure 1.

PACIFIC DISTANCE EDUCATION NETWORK

COMMUNICATIONS CAPABILITIES

	ENHANCED	BASIC	PRIMARY
NUMBER:	6-10	18-20	18-20X
WHERE:	Headquarters of major distance institutions	Distance Education sites at key population centres, containing sizable numbers of students	Outer island sites, remote with small numbers of students
EXAMPLES:	Vancouver Port Moresby Suva Brunei	USP Centres (10) UPNG (2)	
FUNCTIONS:	Administration Research Specialized Instruction	Instruction	Instruction
REQUIREMENT:	Fully interactive	Fully inter-active	Limited interactivity
SERVICES:	Basic + Videoconferencing	Audio-conferencing E-Mail	Voice Conferencing
SCOPE:	Trans-National	National Trans-National	Local National
NETWORK:	Public Network - Core Network	Internal/Dedicated	Mix

The core network, which the study will define and design, will be satellite based and provide the Basic level of capability indicated in the middle column of the table. The essential service components comprising the core network will be high quality audioconferencing and computer messaging. The complementary nature of the proposed core network to established systems and services is highlighted by the Primary and Enhanced capabilities described in the table, which would derive from the conventional, tariffed services of local and international carriers. Indeed, to respond to the diverse needs of the distance education community, we are essentially fashioning a "Network of Networks" which will make optimal use of available systems and services and provide maximum flexibility to users.

The establishment and operation of such a "Network of Networks" will require a high degree of co-ordination from both a managerial and technical standpoint. Some of the key functions would involve:

- the procurement of telecom facilities and services on a common basis, in order to optimize prices and to "mix and match" as appropriate;
- the administration of the network, including scheduling, billing and planning activities; and
- finally, the management of the network in a technical sense, for example, the allocation and dedication of circuits, network monitoring and so on.

These organizational requirements will also be assessed in the COL report, and options and recommendations presented with respect to how such functions could be performed and by whom.

In our view, such a regional, shared-user network concept could provide the model for regional networks for distance education throughout the Commonwealth, particularly in those areas where there is a high proportion of small states and institutions and where such a network could usefully supplement the coverage of conventional networks and services. The technical and operational parameters of the network, as defined in the feasibility study, could very well be generalized for application to the distance education needs of other regions which could benefit from the availability of a shared, multi-purpose network operating on a trans-national and region-wide basis. Ultimately, the feasibility study could thus form the core of a comprehensive plan for establishing a regional distance education network for one or more of these regions, such as the Caribbean, Southern Asia, and Africa. Such a plan could have a unique appeal from a development perspective, because it would constitute both an important element of physical infrastructure, as well as a cost effective means of promoting human resource development and, therefore, would presumably be of interest to educators, telecommunications enterprises and international funding agencies alike.

8. 0 Conclusion - A New "Social Contract" for Distance Education

Even though the technological promise of telecommunications provides many possibilities for addressing the challenge of development, its effective exploitation in the realm of distance education faces many serious barriers of an economic, institutional and political nature. To overcome even a few of these barriers will require a considerable effort within both the telecommunications and educational communities. For its part, the telecommunications

community must continue its efforts, through the ITU and other agencies, to extend the reach of telecommunications networks and services. Educators, on the other hand, must begin to expand their collective investment and commitment to technology as an integral part of educational systems, and to co-operate in its implementation.

Apart from what occurs within each of these communities, however, there will eventually be the need to narrow the gulf between the worlds of education and telecommunications. Perhaps more than any other organization, The Commonwealth of Learning recognizes the cultural and institutional divisions between the two communities, and is committed to bridging this gap by promoting a sustained, constructive dialogue on their respective, but complementary, roles in the development process. We hope that such a dialogue can fashion what in a sense will be a renewed "social contract" that will allow both communities to reconcile their respective interests in a common effort to utilize technology for social benefit. Only a collaborative effort along these lines can ensure that the enormous promise of telecommunications technology will generate significant gains in terms of responding to the challenge of development.

END NOTES

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A SELF-ASSESSMENT SYSTEM FOR A DEVELOPING SCHOOL SYSTEM

by
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ABSTRACT

The Eyestone System is an approach to the problems of evaluation, assessment, and accountability that are found in many small school systems. It has been designed to provide a basis for internal control over education in a developing school system with weak central control and low levels of parental involvement. The process is both reflective and instructive. A committee of community members actually assesses their school and develops its own reports. They are supported by questionnaires and analysis tools. Through the use of the system, people become empowered to make their school a more important part of the community.

INTRODUCTION

In recent years there is a general discontent about schools and school systems. People in most societies are concerned for the future of their children and what role the school plays in developing that future. This is particularly acute in a group of school systems that may be described as developing. These may be relatively new systems, such as the school boards established by aboriginal and ethnic communities, or subsystems of the old school boards in communities experiencing rapid social change. What is common to these is weak levels of local control and lack of parental involvement. While wanting to evaluate or assess their schools, many parents simply cannot or will not dare to ask the right questions of school administrators, principals and teachers, and instead withdraw to the sidelines. The Eyestone System has been created as one answer to this dilemma. It provides an opportunity for interested community members to learn about their schools in the form of structured conversations based on real data. Eyestone supplies the tools and the directions for their use to bridge this learning opportunity with a technology of self-assessment.

ASSESSMENT AND EDUCATION

Assessment, as the word is commonly used, is a determination of the state or condition of a situation. As the use of the term has evolved in the field of education, assessment can be contrasted with evaluation, a term that carries both negative and positive connotations. On the one hand, evaluation is seen as part of the process of laying of blame for deficits and defects, and on the other, it has been used as a convenient means of providing a mechanism to allocate rewards for a job well done. Consequently, evaluation processes tend to be perceived as threatening by those people working or studying within a school. The term assessment, however, at least in the educational sense, is usually reserved for a relatively non-threatening process that focuses on determining the current situation with the aim of improving it. When a community reviews its school, the assessment process is a first step, through which the community members are better placed to view its strengths and weaknesses. This knowledge can then become the basis for making strategic policy decisions for future operations.

A FEW PROBLEMS OF DEVELOPING SCHOOL SYSTEMS

In long established community schools, there are several features that maintain consistency and control within the institution. The parents of the students and other interested parties in the community probably attended the school or one similar to it, and thus, they expect the school to perform certain functions. They also tend to question administrators and teachers to assure themselves that these functions are being performed. At the present time, given the social change that is occurring in society, the expectations of our schools coming from parents and community leaders are often inconsistent with social trends, and, therefore may be problematic. In many developing school systems, this parental link is weak. If parents did not attend schools themselves, or if their experience in schools was unsatisfactory, they lack the knowledge or nerve to question school authorities about their children's education.

In many communities, the school staff has stayed for a long period of time and they have become members of the community. Only a few teachers or administrators move in and out of the community to provide short term or specialized services. In the developing school systems, high staff turnover is a major problem. The new people are not particularly welcomed into the

community, as they are seen to be only temporary residents, and they themselves often do not intend to remain for any length of time. Consequently, little long term investment is made in the school by the staff, and there is little institutional memory or tradition to maintain some of the vital functions of a school.

These two factors lead to weak local control over the school and low levels of involvement by local people in school operations. As a consequence, school may be perceived as something that happens to you, not something that you participate in. There may also be weak central control over the school system, although this is not necessarily negative. In the United States, for example, there is a lack of formal central control over schools, but this is balanced by strong local control and strong community involvement in school affairs. Regional boards of accreditation provide an additional control over the quality of the schools.

ADVANTAGES OF SELF-ASSESSMENT

Self-assessment is a workable alternative to relying on the opinion of external experts who might measure the performance or operation of a small school system or its programs by chalking up shortcomings or advantages against standards from another school board, another jurisdiction, or another country. The process of self-assessment can be a positive and reflective exercise. Designers of self-assessment materials are keenly aware that the majority of the users may be ignorant of the relevance of a particular question to the issue being probed. But that does not make the response less valid. What is more significant is that new knowledge is imparted in the process and that new knowledge opens the mind to consider wider horizons. It is especially important to avoid being destructively critical, either of past or present staff, administrators, or programs. The key is to integrate the expertise of the administration and the teaching staff with the experience of the students and parents to develop a team approach for self assessment. The basic methods of self-assessment are well-known. Most systems rely on check lists, questionnaires, and sometimes very focused and structured interviews. However, the self-assessment process is not a simple distribution of questionnaires to an institution, which staff might or might not complete in some haphazard way. Rather, it should be a rigorous and structured exercise. Data must be collected

in an organized manner, arranged to indicate meaningful relationships and carefully analyzed to produce valid conclusions.

THE EYESTONE SYSTEM

The central feature of The Eyestone System is that it provides an approach and method for local people to carry out an assessment of an institution or organization of their community. They do this by setting up a Local Assessment Committee that brings together representatives of the various groups that have a stake in the organization and its functions. These people become the actual assessors by gathering data and analyzing it through a group of structured conversations called *Data Discussions*.

Each of the discussions is oriented to a particular topic through a set of themes. The relevant data that has been collected is presented and attention is drawn to specific issues by a series of *Focus Questions* appropriate to the theme. The discussion is concluded by a few *Summary Questions*. These *Data Discussions*, then, are the actual assessment sessions. The group determines the current situation of the organization, compares that with what should or might be the situation, and makes recommendations for change. The actual collected data is integrated with the opinions and thoughts of the members of the committee. The experts of the institution that serve on the committee provide professional insights into the goals, objectives, services and operations of the organization. The persons who use or are affected by these services provide their views on the issues surrounding the organization.

It is envisioned that each Data Discussion should take an afternoon or evening and, after eight to ten of these, a *Summary Discussion* concludes the assessment cycle. This closing discussion focuses the group's attention on a review of their findings in order to list strengths, and weaknesses and make a small number of recommendations for change. The proceedings of the Local Assessment Committee are recorded in a *Data Discussion and Summary Report Book* that stands as a record and report of their work.

To support the *Data Discussions*, a variety of hard data is required and the system supplies the tools to gather this data. Community demographic and statistical information is gathered and recorded. Structured reports come from key administrators to provide data about specific school

practices. Questionnaires are distributed widely to parents, students, and community members to determine their opinions and views on the topics for discussion. Other tools are provided to tabulate and manipulate the data in order to prepare it for presentation to the committee. Implementation and instruction manuals guide the officers of the Local Assessment Committee in their work.

The Eyestone System fosters a learning process about the institution and its services to the community. The members of the Local Assessment Committee should be thoroughly involved in every step of the process and, through both their conversations at the meetings and the data gathering itself, should gain valuable insights and new knowledge about their community and its school. The data gathering tools, such as the questionnaires have been designed to give information to the participants using them, as well as taking information from them for the deliberations of the committee. The questions circulated to the community members have been written to stimulate a broader based discussion of the issues among these people.

In applying The Eyestone System to education, a major goal is the development and fostering of a sense of involvement and ownership in the local school. The Local Assessment Committee must have representation from a broad spectrum of the community. The administrators of the school, its teachers and professionals must be represented as the day to day providers of services to the community's youth. It is vital that the youth be represented and, of course, there must be members that are parents. Other interested groups, such as the community council, local school committee, or the church may be asked to name members to the Local Assessment Committee.

Schools and school systems can be assessed along any of several aspects. These might range from the quality of the school buildings, facilities, and equipment, to the actual day-to-day teaching activity in the classroom. One can find examples of assessments where school management and administration are brought to the forefront; others where teachers are placed under scrutiny; and others still where a school's professionals, such as guidance counsellors and social workers, are called to account. The Eyestone system identifies nine distinctive aspects for assessment: 1) Philosophy and Objectives; 2) School and Community; 3) Curriculum and Program of Studies; 4) Student Progress; 5) Organization and Management; 6) Staffing and Hiring Policy;

7) School Facilities; 8) Evolution of the School Board; 9) Student Life. Since it is not practical to cover all nine of these aspects in a single year, a continuous process of assessment is recommended, cycled in such a way that all aspects are eventually covered in an ongoing program that might take four or five years. The first cycle of self-assessment should be used to focus on Philosophy and Objectives, and School and Community, since the issues surrounding these two aspects underlie all decision making for the others.

CONCLUSION

This approach to assessment, then, may be described as a community based self-assessment. The Eyestone System furnishes the tools for data gathering and analysis, and the directions for using them. The external consultants develop and adapt the materials for a self-assessment project to the local situation, while taking into account professional practice. However, it is the members of the community surrounding the institution that do the actual assessing and, in the process, these members acquire a deeper sense of understanding of the institution under study. Through formal and informal reporting to the community about the self-assessment, it is the community that becomes the owner of the outcomes from the Local Assessment Committee. This has a considerable advantage over the development of highly technical reports written by external consultants that are infrequently read, and may not be understood by the non-specialist. The Eyestone System is not designed to replace external evaluations and central control measures such as accreditation, but is oriented to building stronger local control through community development.

Note: A special acknowledgement must be made of Mr I.E. LaRusic, an anthropologist, with whom I have collaborated over the past two years to develop The Eyestone System.

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ASSOCIATION FOR MEDIA AND TECHNOLOGY IN EDUCATION IN CANADA

Handout (please note - presentation will be an abridged version with demo tape)

Time: **Planned 45 minutes**

Principal Author : P.G.Whittingham, Vice President Broadcast & Systems, SONY Of Canada Ltd.

Topic : **Television in the 90's-**

An Industry in *Transition* or *Trouble* ?

Commercial TV is seen to be in crisis.

While this past year was better for many, often as a result of keeping a tight rein on expenses; and some voice quiet optimism, the Broadcast Industry is a long way from full recovery from the recession. Fragmented audiences now attract fewer advertising dollars. Yet operating costs continues to increase with higher maintenance charges for aging equipment and technological obsolescence. The high labour factor in most TV stations is forcing consideration of new operating styles such as the one person Video Journalist and overall plant automation to reduce manpower.

Fewer independents remain as they are swallowed up by various broadcast groups. The cost of such acquisitions further burden the parent organisation and existing stations in the network as money is not available for plant renewal.

Today broadcasters find themselves in a market share war. The discretionary income that Canadians spend on entertainment / information is divided amongst various media and more will follow. While many consumers think of terrestrial broadcasting as being largely "free", we know that advertisers pay in accordance with audience reach and that a broadcasters' ability to profitably offer attractive programming is directly related to it's advertising income.

Niche and Segment marketing also clearly play a role in determining strategy by each program provider. Thus today, CFCF appeals to one type of viewer in Montreal while Quatre Saisions does to another. It is not surprising that today both the print and electronic media have a new focus on "marketing" their services to an increasingly fragmented audience and a number of key positions in this industry are now held by consumer "Brand" managers.

Distribution Race

What lies ahead, possible as a result of new technology, is a distribution race. Terrestrial broadcasting is but *one* delivery mechanism, amongst many.

For the majority of viewers in Canada, cable television delivers the "free TV" ; yet as your monthly cable bill clearly shows, it is far from that. Seen today as a partner with the traditional broadcaster, this may change as Cable devotes more attention to Pay TV/Pay per View and other specialty services in an effort to increase revenue opportunities.

Will the Hughes 220 channel DirectTv be the long dreaded "Deathstar" to the our terrestrial broadcaster or a new mechanism for dolivering Canadian programs to a larger more open North American market ?

Ma Bell and Rogers Unitel are not idle. Fibre to the curb is not that far off. When available, it is expected that Video Dialtone will enable many thousands of video channels to be available to home and business subscribers. Imagine the capability of downloading a 2 hour movie in 15 seconds to a home digital recorder for playback at your leisure? The phenomenal bandwidth that fibre provides will make this possible.

And think of the impact on the present video rental store and the entire movie rental industry. As well, interest in high speed tape duplication has grown dramatically. One SONY client in the US now has more than 70 Sprinter™ systems in operation, capable of reproduction at 200 times that of real time dubbers, designed to get that movie into the distribution channel *for purchase* at much lower cost.

US Advanced Television

The Federal Communications Commission in the US seems committed to the conversion of our present largely VHF terrestrial broadcasting system to a digital high definition transmission scheme called Advanced Television (ATV). This will be implemented largely in the UHF band. Existing broadcasters will have 6 years from the granting of a licence to begin a new "Simulcast Channel". Some flexibility as to camera angles, voice overs, advertising content and schedule will be permitted to reflect the premium nature of this new service but the program content must also be available on the existing channel. After 15 years the FCC plan to discontinue present NTSC *over-the-air* transmissions.

Caught between the need to make a potentially costly conversion to Digital Advanced Television and the increased competition presented from alternative delivery mechanisms, there is little wonder the industry is thought to be in crisis.

Japanese Experience

NHK's analog MUSE system has provided 8 hours a day of HDTV programming since Nov 25, 1991. While it is believed by many that Japan's pursuit of HDTV analogue MUSE transmission has been a costly experiment and that this will quickly be eclipsed by the new US ATV system , it has had never-the-less an impact on the culture of Japan.

Few there would doubt the inevitability of widescreen TV as the format of the future. Yet, even the Japanese market could not justify the high price of 34" HDTV receivers initially offered at nearly $20,000.

Where a small level of success has been realised is the launch of Widescreen NTSC. These *sets* priced as low as $2500 in a 28 " screen have enabled the consumer to gain a taste of what lies ahead. Driven by letterbox format SVHS tapes and Laserdisks, or Hitachi's 8 mm 16:9 NTSC camcorder, these sets have shown that a threshold does exist, below which Advanced Television will sell. As well as handling 16:9 NTSC, these sets generally have a zoom function that permits expansion of 4:3 NTSC onto a 16:9 display.

The Consumer in Japan now has a range of sets from NTSC widescreen and TVs with MUSE to NTSC converters, through to the ultimate full bandwidth MUSE receiver now priced at under

$12,000. The Home Theatre concept has shown it's real potential when combined with the most sophisticated surround sound systems; targeted at the once wealthy average consumer in Japan.

Success whether it has been true HDTV or enhanced NTSC has however only been seen when the software or programming has exploited the merits of this new medium. People do not watch even the most wonderful HDTV images very long if the content is boring. It is now believed in Japan that a family of widescreen technologies at a variety of prices and image quality will co-exist for many years. This is a valuable lesson that should not be forgotten as North America considers it's future.

A North American Point of View

From a technology perspective, North American television is moving from being an analogue NTSC composite signal distributed primarily over-the-air and via cable to an analogue and digital component world that will touch every element of program distribution by the end of this decade. Satellite will deliver hundreds of narrowcast NTSC channels to our homes. There will be far more choice than time available to view even a small portion of the offering. TV on demand will prevail. And consumers will soon have *digital* videotape recorders that will challenge program producers at every level of quality.

The CRTC in March heard from the industry on how it sees the future unfolding. While it is far from certain, it seems unlikely that the Regulator can or will wish to intervene in Direct to Home Satellites such as Hughes DirecTv planned for spring 1994. Equally likely is the creation of a Canadian equivalent. Star *Wars* .... the Next Generation .... you might say !

The North American television industry will likely maintain some key element of localism; and Canadian "free TV" most certainly will continue to serve as a very visible demonstration of a unique Canadian identity. But in large measure, we shall be inundated with hundreds of pay programs ranging from gala events such as the '96 Olympics in HDTV to specialty interests like a Computer Channel where you might have Bill Gates introduce you to an instructional video on how to use Excel or hear John Scully launch the Apple PowerPC or next version of Quicktime.

The real risk of a "open sky" policy is that we may lose a Canadian identity to television if our programming does not attract local viewers.

Program Production is Vital

Consumers rarely watch "stations". They generally tune-in to Bay Watch, LA Law, ENG or The National. While the technologists cry out for improved picture quality on cable, you rarely turn away from your favourite program to watch another because of it.

I believe a huge opportunity exists for Program Producers in Canada to develop the market for specialty interest and cable programming more profitably than our cousins to the south. If we have learned to be profitable producing for 26 million in Canada, we should be able to apply these economies to the smaller multiple specialty services that will soon blossom.

On the Pay TV side, Len Bransom, President of the Movie Network, was recently quoted as saying that Pay is turning to program exclusivity to ensure *their* survival; but US features are becoming harder and harder to negotiate. While TMN are open to running Canadian produced Series and event programming, feature film will continue to be their focus.

Yet these specialty interest programs should not be limited only to the Canadian market, nor indeed North America. Production efficiency would suggest conversion to 625 line standards for Europe; or indeed converted to small format such as 8mm for rental or purchase.

In the near term, continuing consolidation of the entertainment industry means fewer but stronger Canadian players with more co-production and joint venture agreements targeted at overcoming giant US cable & Satellite operators. High quality programming however has a world appeal.

In the longer term, a solution to this new reality might well be more *cost effective* production; a cottage industry focussed on smaller audience segments.

And what about educational opportunities? Will this be the real break for University of the Air , the Open Learning Agency or TVO to reach much bigger markets?

Industry Production Technology Trends

Today a very peculiar movement is being seen. Despite the increasing concern for cost of production, sitcoms, daytime serials and MOW's are now going back to 35mm and recently Super 16mm film stock, we believe driven by an interest in protecting these properties for the widescreen era as well as optimal conversion to world broadcast standards.

Where video production is planned or undertaken, increasingly digital production techniques are employed for optimal production flexibility. Component technology (as opposed to encoded composite NTSC) is definitely the preferred video media today; whether analogue or digital as it offers more convincing effects, better colorimetry and optimal transcoding to release formats including film. But component quality has come only with a cost or system complexity that has discouraged widespread use.

But this is now changing. A chip set now makes possible one wire component digital signal routing complete with 4 channels of digital audio over an ordinary co-axial cable.

And soon very mild data compression will bring component digital recording within reach of most television producers.

Lowly audio; once an after thought (sometimes call a voice over) in video production ; can now be recorded in 4 channel 20 bit digital audio quality along with the picture. In fact the very best audio available today is found on the new generation of digital *video* recorders. 4 Channels for surround sound, alternative language tracks - whatever !

Convergence of the Media

Where would we be without computers today? Certainly TV Production is highly dependent upon them for control and signal manipulation. Of late, we have become increasingly aware of the power of computer originated material and it's importance as a legitimate production medium. Amusingly, CGI is today where video was a decade ago - constantly needing to prove it's legitimacy as an art form. Yet it is the only truly affordable high definition medium available to the average producer,other than 35mm still photography.

Recently, concerns have been expressed for the selection of a new ATV standard being made in a "broadcast vacuum". Many experts employed in the computer, telecommunications, publishing and entertainment fields are worried that inter-operability amongst the types of digital media will become a major problem in the future if not factored into the future HDTV standard.

Inter-operability deals with the issues of exchanging the digital representations of high resolution images between different industries or different applications within the same industry. The US FCC are committed to considering the impact of computers on an ATV standard.

Format Confusion

With all the worries about obsolescence, is there any safe harbour from the video format storms? D1? D2, D3? D5? MII, Betacam, U-Matic, VHS, 8mm ? Often referred to as the "format of the month club".

Clearly trends are becoming very evident and you can use these indicators to help plan a course that minimises the risk to your present hardware and software investment.

First, while composite recording and transmission has been an effective way of producing *and* distributing programs in the past we we must now recognise the need to separate the processes of acquisition, post production, distribution and display. Inter-operability and flexibility is a key factor in the future success equation.

Today component analogue is the dominant signal format for high quality professional production. While Panasonic MII has made some impact on the Broadcast industry, this segment of the industry is dominated by Betacam format hardware from AMPEX, BTS, Thomson CSF and SONY with more than 200,000 devices *now* in use since the format's inception 10 years ago.

The once dominant SONY U-Matic, now estimated to be more than 1.2 million strong after nearly 25 years of service, continues to be a strong contributor to our marketing efforts for institutional production. However VHS and SVHS now control the distribution market. Last year SONY announced the PVW series Betacam; a cost effective component analogue recorder positioned as an alternative to the BVU Series composite U-Matics. Along with Panasonic's lower cost MII, these new CAV recorders have to a large degree succeeded the *Broadcast* U-Matic series in the institutional market.

The format wars continue to work their wonders. Today, high quality component production hardware is within reach of most community colleges and universities. But it will not end there.

The SONY VO Series editors are the last vestige of U-Matic; with quality unimaginable a few years ago; now targeted at SVHS price levels. In time,this area is expected to be impacted by even more affordable component analogue hardware. It would seem likely that the U-Matic will *then* bow out gracefully - likely 10 years after JVC announced it's premature death; and 30 years from launch - a real workhorse and milestone in the history of television production. But don't count it out yet.

But what of the high end ? Going....going... gone .... DIGITAL.

The recent D2/D3 composite digital formats have achieved modest success with approximately 8,500 devices in the SONY D2 camp (plus AMPEX numbers) sold over 4 yrs; and about 2500 for Panasonic's D3, largely populated over the last three years. However, they both seem vulnerable to the new wave of component digital recorders announced at this year's NAB.

Digital Betacam; a half inch recorder capable of playing back analogue Betacam recordings; and using a mild form of data compression, proved to be the most successful new format launch in SONY history with more than 1000 units on backorder after the 4 day show.

Panasonic's D5 was positioned as a non - compressed digital component format ; successor to SONY/BTS D1 ; using more cost effective 1/2" tape technology at prices likely to approach Digital Betacam.

Component Technology is the Key to Flexibility

My thesis is premised on the need and indeed inevitability of component technology being the dominant force in video acquisition, production and display in the next few years and for the foreseeable future.

Transmission will continue to be composite in nature until such time as ATV prevails, in the next decade.

Digital component will serve the needs of the highest quality production and multi-generation performance; analogue component becoming the successor of SVHS and U-Matic production where cost effectiveness has high priority.

Even the use of S- connectivity on Hi-8, SVHS and LD is a recognition of need to avoid NTSC limitations.

Computers generated images, fundamentally produced in digital component form will also drive this trend, defaulting to 'S' connectivity and composite only as required to interface to low end production hardware.

A Hierarchy of Component Technology

We see the likelihood of a hierarchy of component production quality:

- Digital HDTV for Electronic Cinematography / Electronic Theatre
- Digital ATV Production Standard (to be developed)
- 525 WS Transition Format (4:3 / 16:9 switchable)
- 525/625 Current D1 Digital Component Standard
- Component Analogue - entry level

All these would require up or down conversion to the ATV transmission standard (consistent with it's 660 line performance) at some point in the plant.

An NTSC plant can be designed for concurrent production of NTSC and 525 WS as a 5 to 10 year mid range transition scenario. Such equipment is now available.

This new generation of workhorse digital component 525 line production/replay equipment could operate today in 4x3 to support present NTSC needs, then switched to 16x9 for up conversion to ATV. The cost of such technology carries a very small premium over current NTSC hardware.

When affordable true HDTV Production equipment becomes more viable with the application of new technology and with the economy of scale resulting from the need by the service providers for higher quality than 525WS potentially can deliver, then integration of NTSC/525WS/HDTV can be effected - all with conversion to the FCC transmission standard or other delivery mechanisms.

Such an INTERIM APPROACH is consistent with proponents of interoperability who see separate hierarchies evolving for each element of the production and distribution process ie. a variety of price and performance levels for production hardware, distribution channel and display devices.

Conclusion :

Television broadcaster are facing the prospect of their traditional delivery mechanisms being radically altered before the end of the decade. The broadcast license holder may be required to spend considerable funds to protect their current investment by plant modernisation should they so choose.

Transition planning is an imperative keeping in mind that :

DIGITAL technology will prevail.

COMPRESSION techniques will make it affordable; and

COMPONENT Video (analogue or digital) provides the optimal flexibility for format conversion and interoperability.

The future will unfold as it should ..... and with proper planning :

" Please do not adjust your set ... Network Difficulties are Temporary"

ADAPTING A COMMERCIAL NEWSPAPER EDITORIAL SYSTEM FOR TEACHING AND LEARNING

by

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Abstract

This paper describes the adaptation of a commercial newspaper editorial system for use in the secondary classroom. We began with the premise that teachers and students could interact the way editors and writers do at a newspaper. However, the flow of information in the English classroom is substantially different from the flow of information in a newsroom. Thus, the editorial system required extensive customization. The design of the customizations was lead by a former English teacher turned computer scientist, who involved the high school teachers in the customization process and translated their needs for the software engineers. The editorial system is currently in its second semester of use. Anecdotal reports indicate that the customized editorial system is effective for teaching and learning; a formal research study has been designed to follow up on those anecdotal reports. The project demonstrates that the customization of commercial hardware and software for the classroom is promising but labor-intensive, and that successful customization depends on the effective translation of pedagogical needs into technical specifications.

Introduction

An editorial system is a hardware and software network used by reporters and editors at a newspaper. It is designed especially for creating, sharing, and editing newspaper articles. The hardware and software of an editorial system are highly customized for writing and editing, and foster cooperative work. Reporters and editors craft words. They are not responsible for the appearance of the final page. Thus, an editorial system provides only rudimentary text-formatting capabilities, such as bold and italic, and does not include a page layout facility.

The hardware and software for a 22-seat editorial system were donated by Atex Publishing Systems (Billerica, MA, USA) for this project. The editorial system has been installed in the public high school in Wakefield, MA, a middle-class suburb of Boston. The school has 10 English teachers and an enrollment of 900 students in grades nine through twelve. The editorial system has been customized for teaching and learning, and is currently in its second semester of use at the high school.

To our knowledge, this project is the first to customize a commercial newspaper editorial system for instructional use in the high school classroom. We began with the premise that teachers and students could interact the way editors and writers do. However, since the flow of information in the English classroom is substantially different from the flow of information in a newsroom, the editorial system required extensive customization.

The teachers did not have sufficient knowledge of computers to design the customizations themselves, nor did they have the time and resources to gain such knowledge. Similarly, the software engineers who were assigned by Atex to carry out the customizations did not have sufficient knowledge of the teacher's workplace and of the teaching of writing to design the customizations. The design effort was lead by a former English teacher turned computer scientist, who served as a translator between the language and workplace conventions of the teachers and the language and conventions of the software engineers.

The project demonstrates the labor-intensive nature of customizing commercial hardware and software for the classroom. It also demonstrates the importance of providing a designer who, by translating between the teachers and the engineers, can enable the teachers to be participants in the customization of technology that will have a major impact on how they do their jobs.

The editorial system

The editorial system's hardware consists of 22 terminals (a mixture of Atex terminals and IBM PC's); Atex proprietary keyboards, which are highly customized for writers and have dedicated or programmable keys for many wordprocessing functions; a customized Digital Equipment Corporation minicomputer; and a laser printer. The editorial system resides in a suite of one small and two large rooms. The small room houses the minicomputer and is used as an office by the school's English coordinator. One of the large rooms is the "newsroom" which houses the 22 terminals. The other large room is the layout room, where the school newspaper staff meets and performs page layout of the school newspaper. (See Figure 1.)

The software is Atex's basic editorial system, used worldwide by newspaper writers and editors. The software offers traditional word-processing capabilities, nearly all of which are available via special keys on the keyboard. It also offers features for cooperative work by writers and editors. These features include electronic mail, file sharing, and red-lining. The editorial system does not include page layout capabilities, because reporters and editors do not perform page layout. It supports only simple formatting, such as bold, italic, and underlining. Currently, page layout of student writing for the school newspaper is done by the newspaper staff on an Apple computer, although the long-range plan is to incorporate layout into the writing curriculum.

Each sophomore and junior English class uses the editorial system lab, instead of a traditional classroom, for one out of four terms. Thus, the lab is used by a total of 450 students per year. All of the English department's 10 teachers chose to be trained to use the editorial system.

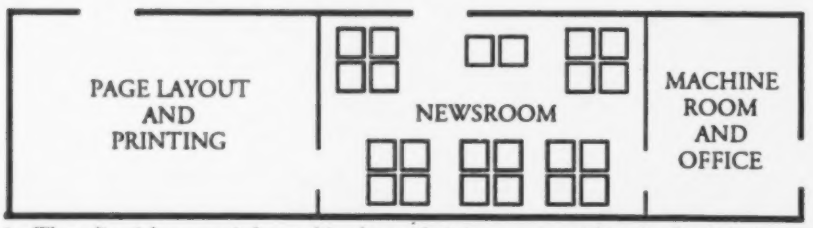

Figure 1. The editorial system is housed in three adjoining rooms within the English department. In the newsroom, the 22 terminals are arranged in clusters, with each workstation facing the others in its cluster.

Customizing the editorial system

The project began with the premise that teachers and students could interact the way editors and writers do at a newspaper. However, the flow of information in the English classroom is substantially different from the flow of information in a newsroom. Thus, the editorial system required extensive customization in order to support the business of teaching writing.

The teachers' expertise was in teaching writing, not in using computers. Understandably, none of the teachers knew enough about hardware or software to define the necessary customizations or even to carry on useful dialogues with the software engineers. They had neither the skills to evaluate the existing capabilities of the editorial system nor the skills to tell the software engineers what customizations they needed. They were unfamiliar with basic computer-ese, such as "file," "directory," "username," and "electronic mail." They were unfamiliar enough with wordprocessing that they asked one of the school's business teachers for a list of basic wordprocessing capabilities. They did not have the skills to look at differences in workflow in a paper-based vs. a computer-based classroom. Moreover, they were given no release time to learn about computers or to work on the customizations.

The engineers were experienced in tailoring editorial systems for specific newspaper sites. They were knowledgeable about the editorial system and about workflow in a newsroom. They were used to newspaper jargon, and a lot of that jargon had been incorporated into the editorial system. For instance, where a teacher would "throw away a paper," a computer person would "delete a file," and a newspaper person would "spike a story," a metaphor for the traditional metal spike on which papers to be discarded could be impaled. In the editorial system, a file is deleted by sending it to the "spike queue." The engineers' language was a mixture of computer talk and newspaper talk, while the teachers spoke the language of writing instruction.

The engineers had general assumptions about what teachers do in the classroom, but were not aware of specific activities and conventions of the workplace. (A trivial example of their unfamiliarity with life in the high school classroom was their suggestion to use "stud" as an abbreviation for "student" in naming some computer accounts.) Their time was donated to perform customizations, but they had neither sufficient time nor sufficient knowledge of the teachers' workplace to design those customizations.

The customizations were designed by a former English teacher turned computer scientist. This "translator" enabled the high school teachers to participate in the customization process by translating their needs into specifications for the software engineers. The translation process had these steps: (1) Elicit from the teachers a description of writing-related activities currently used in their paper-based classrooms. (2) Determine how these activities could be carried out and extended, based on the existing and potential capabilities of the editorial system. (3) Figure out the implications of the computer-based versions of these activities on information flow, security, and usability. (4) Describe the extensions to the teachers in their own language and in terms of classroom activities, and see if they wanted them. (5) Translate the descriptions of the activities from the language and workplace conventions of the teachers to the language and conventions of the engineers. (6) Work with the engineers to specify the customizations to the editorial system.

The customization of the editorial system was an exercise in participatory design, an emerging field that seeks to enable the end users of a computer technology to participate in the design of that technology and in the analysis of the impact that the technology will have on their workplace. For general information on participatory design, see [CACM 1993]. For more information about translation in participatory design, see [Williams and Begg 1992, 1993a and 1993b].

Examples of customizations

The customizations that were made to the editorial system fall into three categories: versioning of files, security, and usability. An example from each category is described in this section.

Versioning of files. In a newsroom, there is one current version of a "story." Either the editor has it or the writer has it. When one of them sends the story to the other, the story disappears entirely from the sender's workspace and now appears only in the recipient's workspace. Earlier versions of the story are archived and are rarely retrieved. By contrast, in an English classroom where *process writing* is taught, students are expected to maintain a library of the various drafts of an essay. When a student submits a draft to the teacher, the student should retain all earlier versions, as well as a copy of the current version, in his or her workspace. The versioning capabilities of the editorial system were customized to reflect these differences. The "send" command for sending a file to another user was extended. Whenever a student submits a paper to the teacher electronically, a new version number is automatically assigned, and all drafts are archived in the student's own workspace. The teacher may return the paper to the student with or without creating a new version.

Security. According to the Atex engineers, plagiarism is not a major concern within the newsroom. Consequently, the editorial system permits writers to have access to stories in each other's workspaces. Also, old versions of stories are stored in a public archive and can be retrieved by any writer or editor. Plagiarism is, unfortunately, a concern in the writing classroom. The editorial system was customized to remove the temptation for plagiarism. A student is given access only to his or her own files and to certain public files made available by the system manager or the teacher. Moreover, the public archive of previous versions of essays was eliminated. All drafts of a student's essays are kept in the student's own workspace.

Usability. In the paper-based classroom, the teacher hands out a variety of English department guidelines, such as the guidelines for acceptable manuscript form, the late work policy, and the glossary of correction symbols. Students are required to bring their copies of these guidelines with them to class every day. The on-line help facility of the editorial system was customized to include these guidelines. From the main help menu, students can go directly to any of these official documents.

Anecdotal reports of effectiveness

The teachers report the usual motivational value of successfully integrating computers into the curriculum, specifically that (1) students enter the lab and get right to work rather than chatting with their classmates until the teacher calls them to order, (2) non-attending students start attending class, and (3) students who appear passive in the traditional classroom are actively engaged by the computers.

In addition, the teachers report greater attention to the writing task than they have ever witnessed before. They are besieged with questions, not about the computers, but about the students' writing -- questions about style, organization, and usage. Moreover, the teachers report that the comments that they embed in a student's electronic essay are taken more seriously than their red-ink comments in the margins of an essay submitted on paper. They say that students

are more apt to perform the indicated revisions. Verbal feedback from students is very positive ("These computers are awesome!").

A few of the teachers had previously watched students use Apple computers, and had observed how the students were consumed by the joys of using various fonts, type sizes, and special effects making their text look dramatic. With the editorial system, they report that the students' focus is on making the writing good, not on making it pretty.

As with many other computerization-of-the-English-classroom efforts, including the majority of those described in [Wresch 1991], the editorial system is being used to carry out traditional classroom activities that have been moved from chalkboard or paper to the computer. The teachers are only gradually learning to exploit the editorial system's capabilities for collaborative work.

Research plan

Each sophomore and junior English class uses the editorial system for one term out of four. Thus, it is a simple matter to study an experimental group during the terms before, during, and after it uses the editorial system. Moreover, it is possible to have a control group that does not use the lab during those terms. (See Figure 2.) We would particularly like to study differences between the experimental and control groups in:

1. progress in the acquisition of writing skills;
2. quantity and quality of teacher-student interaction, both written and oral;
3. quantity and quality of collaborative work among students.

We will, naturally, have to solve the usual problems of matching groups for salient characteristics such as ability level and of keeping variables (such as who the teacher is) constant across groups. We are currently seeking funding to perform this study.

Implications for the customization of commercial hardware and software

The process of customizing the editorial system for use in the secondary English classroom was labor-intensive. The resources of the University of Massachusetts at Lowell, Atex Publishing Systems, and the Wakefield Public Schools were brought to bear during the customization process and continue to be brought to bear for maintenance and system management. The university provided the translator who lead the design of customizations. Atex provided engineers to install the editorial system and to perform the customizations, as well as a trainer to teach the teachers how to use the editorial system. The Wakefield Public

	Term 1	Term 2	Term 3
Experimental group	traditional classroom	editorial system lab	traditional classroom
Control group	traditional classroom	traditional classroom	traditional classroom

Figure 2. The change in writing skills, quantity and quality of teacher-student interaction, and quantity and quality of collaborative work of the experimental group who use the editorial system during the second term of the study will be compared to those of the control group who do not use the editorial system until the study is over.

Schools bore the costs of site preparation, including the installation of a security system, and provided a summer workshop for revising the writing curriculum. The teachers have devoted countless hours to learning to use and to teach with the editorial system.

Based on comparison with another project [Williams et al. 1992], customization is more complex for special-purpose hardware and software than for generic hardware and software. Because commercial hardware and software, such as the editorial system, embody a way of doing work, they must be carefully tailored to the teachers' workplace. The customizations need to be designed by someone with the skills and resources to translate between the teachers and the engineers. The translator was vital to the customization of the editorial system, since the teachers and engineers did not have knowledge of the each other's work and workplace, and did not have sufficient resources to develop such knowledge. The translator was accepted by both teachers and engineers as somebody who spoke their language and who knew how their work responsibilities were being affected by the project.

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